

EPA ID: MAD055988927 Site Name: NEW ENGLAND RESINS & PIGMENTS

State ID:

Alias Site Names: NEW ENGLAND RESINS & PIGMENTS

City: WOBURN

County or Parish: MIDDLESEX

State: MA

Refer to Report Dated: 03/13/2002

Report Type: SITE REASSESSMENT 001

Report Developed by: START



SEMS DocID 633024

DECISION:

☒ 1. Further Remedial Site Assessment under CERCLA (Superfund) is not required because:☒ 1a. Site does not qualify for further remedial site assessment under CERCLA (No Further Remedial Action Planned - NFRAP)☐ 1b. Site may qualify for action, but is deferred to:☐ 2. Further Assessment Needed Under CERCLA:2a. Priority: ☐ Higher ☐ Lower

2b. Other: (recommended action) NFRAP (No Further Remedial Action Planned)

DISCUSSION/RATIONALE:

The U.S. Environmental Protection Agency (EPA) has determined that no further remedial action by the Federal Superfund program is warranted at the referenced site, at this time. The basis for the no further remedial action planned (NFRAP) determination is provided in the attached document. A NFRAP designation means that no additional remedial steps under the Federal Superfund program will be taken at the site unless new information warranting further Superfund consideration or conditions not previously known to EPA regarding the site are disclosed. In accordance with EPA's decision regarding the tracking of NFRAP sites, the referenced site may be removed from the CERCLIS database and placed in a separate archival database as a historical record if no further Superfund interest is warranted. Archived sites may be returned to the CERCLIS site inventory if new information necessitating further Superfund consideration is discovered.

Site Decision Made by: NANCY SMITH

Signature: _____

Date: 05/02/2002

REGION I PEER REVIEW
SITE ASSESSMENT GROUP CERCLIS DECISION RECORD

Site Name: New England Resins & Pigments

CERCLIS # MA055988927 City: Woburn

Site Assessment Product Reviewed: PA SI SIP Other SR

Date of Product Reviewed: 11-26-01

EPA SAM: 1). Nancy Smith Date: 3-13-02
~~11-27-01~~

Peer Reviewer(s) 2). Don Smith Date: 3-13-02

3). _____ Date: _____

4). _____ Date: _____

Recommended CERCLIS Decision:

Reviewer (1) (2) (3) (4)	NFRAP - No Site
Reviewer (1) (2) (3) (4)	NFRAP - No CERCLA Hazardous Waste
Reviewer (1) (2) (3) (4)	NFRAP - Petroleum Only
Reviewer (1) (2) (3) (4)	NFRAP - Low HRS Score (<28.5)
Reviewer (1) (2) (3) (4)	NFRAP - Other (Explain Under Comments)
Reviewer (1) (2) (3) (4)	Defer to RCRA Subtitle C or NRC
Reviewer (1) (2) (3) (4)	Low Priority Site - Archive Recommended
Reviewer (1) (2) (3) (4)	Continued Investigation Under CERCLA Recommended

Comments Reviewer (1) :

Comments Reviewer (2) :

Comments Reviewer (3) :

Comments Reviewer (4) :

**SITE REEVALUATION MEMORANDUM
FOR
NEW ENGLAND RESINS AND PIGMENTS
WOBURN, MASSACHUSETTS**

Prepared For:
U.S. Environmental Protection Agency
Region I, Suite 1100
Office of Site Remediation and Restoration
1 Congress Street
Boston, MA 02114-2023

CONTRACT NO. 68-W-00-097

CERCLIS NO. MAD055988927
TDD NO. 01-08-0017
PCS NO. 2887
DC NO. A-2672

Submitted by:

Roy F. Weston, Inc. (WESTON®)
Region I
Superfund Technical Assessment and Response Team 2000 (START)
37 Upton Drive
Wilmington, MA 01887

Submittal date: 8 March 2002

Region I START 2000

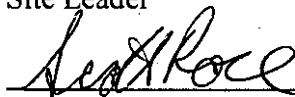
Reviewed and Approved:



Eric Marshall
Site Leader

3/8/2002

Date



Scott Rose
Project Leader

3/8/02

Date

EPA Region I

Reviewed and Approved:



Nancy Smith
Site Assessment Manager (SAM)

3-13-02

Date

SITE REASSESSMENT MEMORANDUM

TO: Ms. Nancy Smith (EPA Region I Site Assessment Manager)

FROM: Mr. Eric Marshall (Site Leader) DATE: 8 March 2002
THRU: Mr. Scott Rose (Project Leader)

PROJECT: START Site Reassessment W.O. NO.: 20104-001-001-2887-20

SUBJECT: Site Reassessment Recommendation
New England Resins and Pigments
Woburn, Massachusetts
CERCLIS No. MAD055988927
TDD No. 01-08-0017

Introduction

Under the direction of the U.S. Environmental Protection Agency Region I (EPA), the Roy F. Weston, Inc. (WESTON®), Superfund Technical Assessment and Response Team 2000 (START) conducted a review of file information on the New England Resins and Pigments (NERP) property in Woburn, Massachusetts to evaluate the need for further action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Site Assessment Program. All documents reviewed for the Site Reassessment can be found listed in the References section located at the end of this memorandum.

The Draft Preliminary Hazard Ranking System (HRS) Evaluation for the NERP property completed as part of the 1998 Site Inspection Prioritization (SIP) assigned the property a score above the cut-off value of 28.5, indicating a potential for property to be listed on the National Priorities List (NPL). However, based on a review of the above-mentioned documents, the 1998 HRS evaluation does not accurately portray current site conditions on the NERP property.

General Information

The NERP property is located at latitude 42° 31' 30.6" north and longitude 71° 9' 14.6" west at 316 New Boston Street in Woburn, Middlesex County, Massachusetts. The 16.15-acre property is bordered to the west by the Woburn Sanitary Landfill, to the east by Boston & Maine railroad tracks, and to the north by the former Olin Chemical Company. NERP is bordered to the south by the Industriplex-128 Site, which is included on the EPA National Priorities List (NPL).

The NERP property and the property to the east have been occupied by a number of different businesses during the past 100 years, including chemical and fertilizer factories. The Merrimac Chemical Company occupied the property from 1853 to 1929. Other chemical manufacturers, not specified in the file information, occupied the property and surrounding area from 1929 through 1963.

The primary activity of the facility presently operating on the property is the storage of pigments, resins, and other bagged and drummed materials which are brought onto the property by rail cars. The packaged and drummed materials remain unopened and are stored in the warehouse until they are distributed by NERP to their customers throughout the New England area. The majority of the materials stored on the property are non-hazardous. NERP does not use any chemicals, manufacture any products, or generate any hazardous waste.

One large warehouse and two smaller buildings are located on the property. A 5,000-gallon aboveground storage tank (AST) containing epoxy resins is located in the southwest corner of the warehouse. The two smaller buildings are used as a flammable materials storage shed and as a storage site of archived records.

Source Evaluation

The Site Inspection Worksheets (SIWs) for the NERP property, completed on 11 August 1998, evaluated the potential and actual sources of hazardous substances at the property. The site score was based on the HWQ value of 100, largely driven by the former wastewater lagoon (Surface Impoundment) source area.

Upon review of the file information, START recommends re-evaluation of the former wastewater lagoon source area. In 1980, a Site Inspection of the property by Ecology & Environment, Inc./Field Investigation Team stated that the former wastewater lagoon "has been completely covered with fill" and that "no standing water exists on the property at this time". The 1998 SIW evaluates the former wastewater lagoon as a surface impoundment; however, after discussions with EPA Site Assessment Managers (SAMs), START has determined the source would be more accurately characterized as a landfill. The HRS definition of a landfill is "An engineered (by excavation or construction) or natural hole in the ground into which wastes have been disposed of by backfilling or by contemporaneous deposition of soil and wastes". Additionally, discussions with EPA SAMs determined that the source will not be characterized as a contaminated soil area because the source is located below ground surface, and does not impact surface soils.

By changing the classification of this source, the revised HWQ score is changed to 10 for all pathways.

Groundwater Pathway

Groundwater occurs in overburden beneath the property at a depth of approximately 15 feet. Groundwater flow beneath the property is in a southeasterly direction. Approximately 48,075 persons rely on groundwater drinking water sources within 4-radial miles of the property. The nearest public drinking water supply well is located 0.6 miles northwest, and serves an estimated 2,311 persons. Although groundwater data are limited, available information does not indicate a release from the former wastewater lagoon. A release has been documented from a former gasoline underground storage tank (UST). Low concentrations of volatile organic compounds commonly found in gasoline (benzene, toluene, ethylbenzene, and xylenes) were detected in groundwater samples collected from monitoring wells in the area of the former UST. No information currently available indicates that this groundwater contamination has a source other than the gasoline UST; therefore, under the CERCLIS Petroleum Exclusion Policy, it is ineligible for evaluation.

Surface Water Pathway

Stormwater runoff from the NERP property flows into a drainage ditch that is located along the eastern boundary of the property, along the Boston & Maine railroad tracks. The drainage ditch, which START has determined to be a permanent water body, discharges to Halls Brook approximately 3,000 feet south of the property. Halls Brook discharges south into the Aberjona River approximately 2 miles southeast of the property. The Aberjona River flows south for 5.6 miles and discharges to Upper and Lower Mystic Lake. Surface water continues to flow south as the Mystic River for 6.5 miles and discharges to Boston Inner Harbor. Sensitive environments along the surface water pathway include a Clean Water Act-protected waterbody, 2.8 miles of wetland frontage, eight State-threatened species habitats, one Federal-candidate species habitat, an anadromous fish migratory pathway, a spawning ground, and a recreational fishery. There are no surface water drinking water intakes along the surface water pathway. VOC screening of surface water samples collected by Goldberg-Zoino and Associates, Inc. (GZA) from the drainage ditch indicated the presence of toluene. Based on a comparison to reference samples, START believes the source of toluene contamination is located upstream of the property.

Soil Exposure Pathway

Twenty-six full-time employees of NERP work on the property. There are no on-site residents; the nearest residence is located on Virginia Avenue approximately 2,000 feet southwest of the property. There are no schools or day-care facilities located within 200 feet of the property. An estimated 3,626 people reside within 1-radial mile of the property. No surface soil sampling is known to have been conducted for the NERP property. Based on property use and the location of on-site sources, no impacts to on-site workers or nearby residential populations are known or suspected.

Air Migration Pathway

An estimated 123,402 persons live within 4-radial miles of the property. An estimated 3,521 acres of wetlands are located within 4-radial miles of the property. In addition, a Clean Water Act-protected water body, and habitats for one State-threatened species, one State-endangered species, and one Federal candidate species are located within 4-radial miles of the property. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred and no impacts to nearby residential populations or sensitive environments are known or suspected.

State Status

The property was given a No Further Action status by the Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup on 28 October 1994.

Summary

START recommends the SIW for the NERP property be amended to incorporate the following revisions: the former wastewater lagoon source will be reclassified as a Landfill source, which describes the source more accurately than the former classification as a Surface Impoundment. The revised HWQ score will be 10 (decreased from 100) for all pathways, which decreases the overall site score.

REFERENCES REVIEWED

- [1] Goldberg-Zoino & Associates, Inc. 1994. Environmental Site Evaluation Update, New England Resins & Pigments, Woburn, Massachusetts. 10 August.
- [2] Goldberg-Zoino & Associates, Inc. 1986. Environmental Site Assessment, 316 New Boston Street, Woburn, Massachusetts. 24 June.
- [3] Rose, S. (START). 1997. Interview with Ms. Carol Cogan, City of Woburn Conservation Commission, RE: Drinking Water Intakes/Fisheries Along Aberjona and Mystic Rivers. TDD No. 97-01-0034. 12 February.
- [4] Charest, G. (U.S. Environmental Protection Agency). 1997. Project Note, New England Resins & Pigments, RE: Rare and Endangered Species Report. Undated. TDD No. 97-01-0034.
- [5] START. 1997. Field Logbook for New England Resins & Pigments Site Inspection Prioritization. No. 00158-S. TDD No. 97-01-0034.
- [6] Ecology & Environment, Inc./Field Investigation Team. 1980. Preliminary Site Assessment of New England Resins & Pigments. 6 August.
- [7] Ecology & Environment, Inc./Field Investigation Team. 1985. Site Inspection and Safety Report for New England Resins & Pigments. 24 September.
- [8] Roy F. Weston, Inc. Superfund Technical Assessment and Response Team, Region I. 1998. Site Inspection Worksheets, New England Resins and Pigments Property. Woburn, Massachusetts. August.
- [9] Marshall, E (START). 2001. Phone Conversation Record with Mr. Matt Audet (US EPA) and Ms. Nancy Smith (US EPA), RE: NERP Reassessment Project. TDD No. 01-08-0017. 13 December.
- [10] MA DEP Office of Research and Standards. 2000. Drinking Water Standards and Guidelines for Chemicals in Massachusetts Drinking Waters. Available from <http://www.state.ma.us/dep/ors/files/sp00dw.htm>. Internet Accessed 14 February 2002.

**United States Environmental Protection Agency
New England Office
One Congress St., Suite 1100, Boston, MA 02114-2023**

Memorandum

Date: February 28, 2002

Subject: New England Resins and Pigments
Woburn, MA
MAD055988927

From: Nancy Smith *NS*
Site Assessment Manager

To: Eric Marshall, Scott Rose, John Kelly
Weston START

em I have reviewed the draft Site Reassessment Memo and SIW, and have the following comments on the memo (I have no comments on the SIW):

em Page 1, 2nd paragraph, Revise to read, "...assigned the property a score above the cut-off value of 28.5, indicating a potential for the property to be listed on the..."

em Also revise to read, "...above-mentioned documents, the 1998 HRS evaluation does not accurately portray current site conditions on the NERP property."

em Page 2, 1st sentence of 2nd full paragraph, Delete last clause, "and assigned a site score of 33.51."

em 3rd paragraph, Revise 3rd sentence to read, "The 1998 SIW evaluates the former..."

em 4th paragraph, Delete last clause, "which decreases the overall site score to 19.39 (below the cut-off value of 28.5)."

em Page 3, last paragraph, last sentence, Delete last clause, "to 19.39 (decreased from 33.51)."

Please submit the revised memo and final SIW on plain paper. If you have any questions, I may be reached at (617) 918-1436.

*All comments addressed
em 3/7/2002*

**SITE INSPECTION WORKSHEETS
FOR
NEW ENGLAND RESINS & PIGMENTS
WOBURN, MASSACHUSETTS**

Prepared For:
U.S. Environmental Protection Agency
Region I
Office of Site Remediation and Restoration
1 Congress Street, Suite 1100
Boston, MA 02114-2023

CONTRACT NO. 68-W-00-097
CERCLIS NO. MAD055988927
TDD NO. 01-08-0017
PCS NO. 2887
DC NO. A-2674

Submitted By:
Roy F. Weston, Inc. (WESTON®)
Superfund Technical Assessment and Response Team (START) 2000
37 Upton Drive
Wilmington, MA 01887

22 February 2002

SITE INSPECTION WORKSHEETS

(Region I version 6/30/95)

WARNING!!

EPA has determined that the HRS score of any site that is progressing towards listing on the NPL is confidential. Deliberations regarding scoring or listing issues, the site specific status, and HRS scores cannot be released or discussed with non-Agency persons. For additional guidance see the April 30, 1993 OSWER Directive 9320.1-11.

SITE LOCATION

Site Name: New England Resins & Pigments			
Street Address: 316 New Boston Street			
City: Woburn	State: MA	Zip Code: 01801	Telephone: (781) 935 - 8910
CERCLIS ID No.: MAD055988927	Coordinates: Latitude: 42° 31' 30.6" N Longitude: 71° 9' 14.6" W		

OWNER/OPERATOR IDENTIFICATION

Owner: New England Resins & Pigments Contact: Mr. Bill Gurley		Operator: Same as owner	
Owner Address: 316 New Boston Street		Operator Address:	
City: Woburn		City:	
State: MA	Zip Code: 01801	Telephone: (781) 935-8910	State: Zip Code Telephone:

SITE EVALUATION

Agency/Organization: WESTON/START	TDD No.: 01-08-0017
Investigator: Mr. Eric Marshall/Mr. Scott Rose	Date: 7 March 2002

EPA CONTACT

EPA SAM: Ms. Nancy Smith		
Address: 1 Congress Street, Suite 1100		
City: Boston	State: MA	Zip Code: 02114
Telephone: (617) 918-1436		
EPA Reviewer: <i>Nancy Smith</i>	Date: <i>5-2-02</i>	

GENERAL INFORMATION

Site Description and Operational History: Provide a brief description of the site and its operational history. State the site name, owner, operator, type of facility and operations, size of property, active or inactive status, and years of waste generation. Summarize waste treatment, storage, or disposal activities that have or may have occurred at the site; note whether these activities are documented or alleged. Identify all source types and prior spills, floods, or fires. Summarize highlights of the PA and other investigations. Cite references.

The New England Resins & Pigments (NERP) property is located at latitude 42° 31' 30.6" north and longitude 71° 9' 14.6" west at 316 New Boston Street in Woburn, Middlesex County, Massachusetts. The 16.15-acre property is bordered to the west by the Woburn Sanitary Landfill, to the east by Boston & Maine railroad tracks, and to the north by the former Olin Chemical Company. NERP is bordered to the south by the Industriplex-128 Site, which is included on the U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) (Figure 1) [3, p. 1].

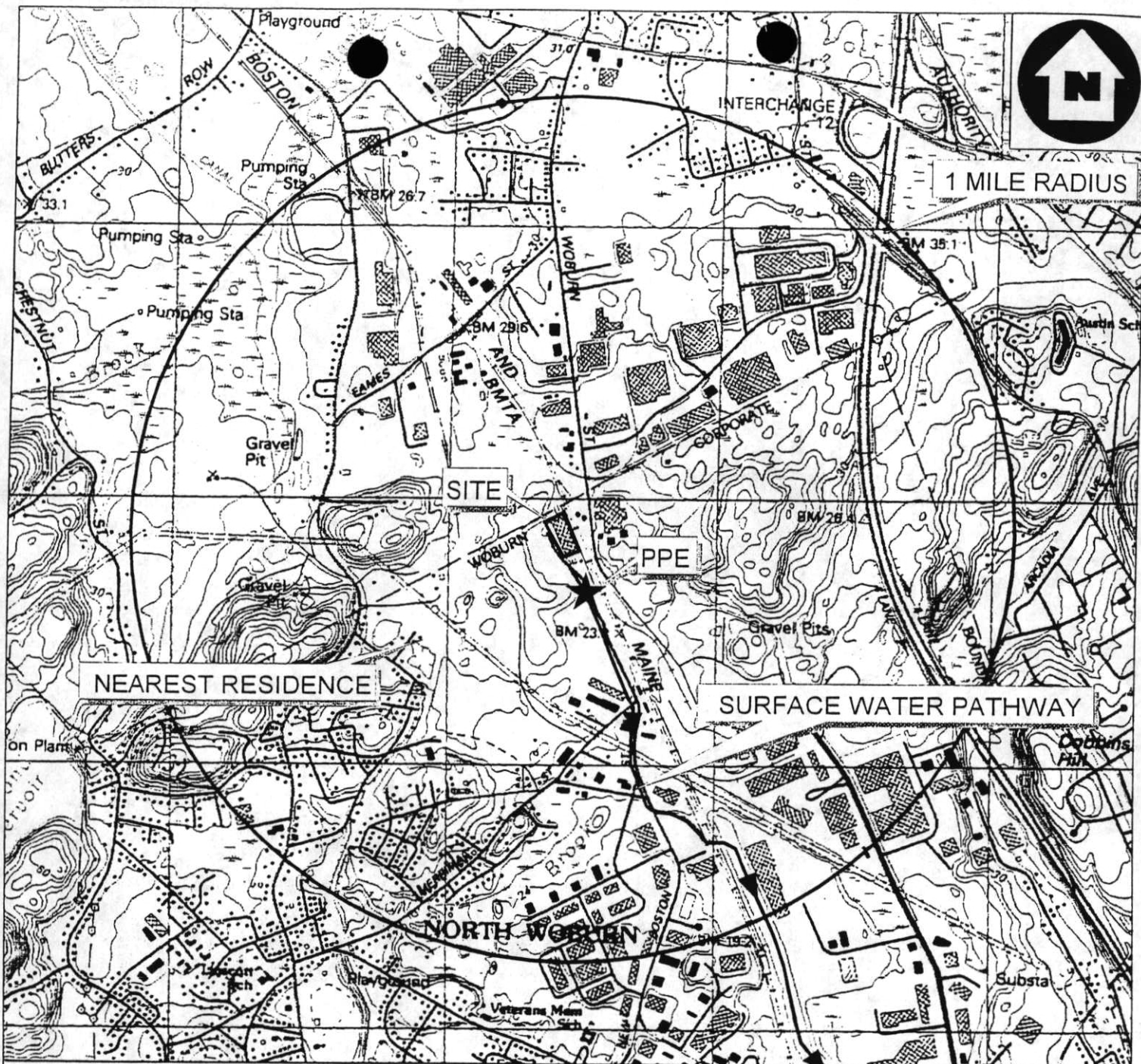
One large warehouse and two smaller buildings are located on the property (Figure 2). The warehouse is made up of two sections. The original, main section has a concrete foundation and a cinder block structure. This section houses the company offices and is used to store most of the materials handled by the company. A 5,000-gallon aboveground storage tank (AST) containing epoxy resins is located in the southwest corner of this building. The second section is a later addition to the main warehouse. It has a concrete foundation and a metal frame with aluminum siding. This section of the warehouse is heated and is used to store temperature sensitive epoxy resins. A 500-gallon propane AST is located outside this section of the warehouse [37, pp. 1-5].

The two smaller buildings, located south of the warehouse, are nearly identical. They are both wooden structures with concrete foundations. The westernmost building, a flammable materials storage shed, has an entrance which is bermed to contain spills. The easternmost building was partially boarded up at the time of the Superfund Technical Assessment and Response Team (START) on-site reconnaissance conducted on 4 March 1997 [37, pp. 1-5]. According to a 1994 report by Goldberg-Zoino and Associates, Inc. (GZA), this building is used for the storage of archived records [41, p. 19].

The topography on the NERP property slopes from west to east. Stormwater runoff from the property flows into a drainage ditch that is located along the eastern boundary of the property, along the Boston & Maine railroad tracks, via overland flow and groundwater to surface water migration. Approximately 60% of the property is covered by asphalt paving or buildings, and there is no fence restricting access to the property [37].

A former wastewater lagoon is located near the center of the property. The lagoon has been completely covered with fill consisting of sand, gravel, boulders, and building rubble. It is presently used as open space and a parking and/or storage area [3, p. 2].

A 1,000-gallon gasoline underground storage tank (UST) was formerly located just north of the flammable materials storage shed. This UST was removed in 1983 [37, p. 2; 40, p. 2].



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15' U.S.G.S. QUADRANGLE(S):
 READING MASSACHUSETTS, 1987

0.5 0 0.5 1 Miles

1000 0 1000 2000 3000 4000 5000 6000 7000 Feet

0.5 0 0.5 1 1.5 2 Kilometers



QUADRANGLE LOCATION

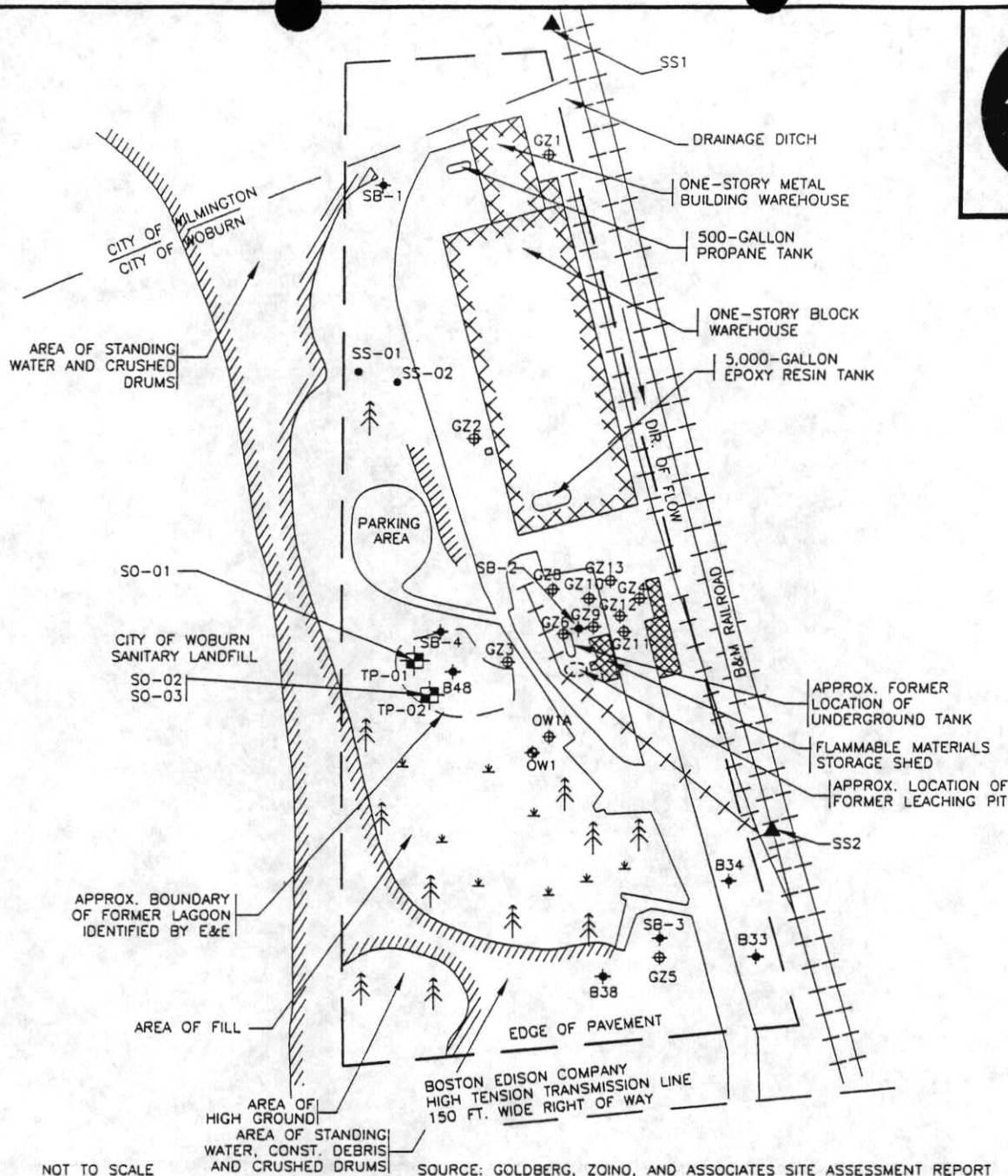
SITE LOCATION MAP

NEW ENGLAND RESINS & PIGMENTS
 316 NEW BOSTON STREET
 WOBURN, MASSACHUSETTS



REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TOD #	DRAWN BY	DATE
01-08-0017	E. MARSHALL	09/26/2001
FILE NAME: S:\01080017\FIG1.APR		FIGURE 1



LEGEND

- ◆ MONITORING WELL (BEDROCK)
- ◆ SOIL BORING
- ≡ WETLAND
- ↑ TREE
- PROPERTY LINE
- SURFACE SOIL SAMPLE
- ⊕ TEST PIT
- ▲ SURFACE WATER SAMPLE
- ⊕ MONITORING WELL (OVERBURDEN)

SITE SKETCH AND SAMPLE LOCATIONS

NEW ENGLAND RESINS & PIGMENTS
316 NEW BOSTON STREET
WOBBURN, MASSACHUSETTS



MANAGERS DESIGNERS/CONSULTANTS

REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD # 01-08-0017	DRAWN BY: M.H.	DATE 4/16/1997
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FILE NAME: S:\01080017\FIG2.DWG

FIGURE 2

GENERAL INFORMATION (Continued)

The primary activity of this facility is the storage of pigments, resins, and other bagged and drummed materials, which are brought onto the property by rail cars. The bagged materials include iron and titanium oxides, organic pigments, limestone, talc, calcium carbonate, and cabosil [3, p. 1]. Approximately 200,000 pounds (lbs) of epoxy resins, stored in 55-gallon drums, are located in the warehouse [37, p. 2]. Conspicuously leaking drums are refused during delivery [2, p. 4]. The packaged and drummed materials remain unopened and are stored in the warehouse until they are distributed by NERP to their customers throughout the New England area. The majority of the materials stored on the property are non-hazardous [3, p. 1]. NERP does not use any chemicals, manufacture any products, or generate any hazardous waste [3, p. 1].

The NERP property and the property to the east have been occupied by a number of different businesses, including chemical and fertilizer factories, during the past 100 years. The Merrimac Chemical Company occupied the property from 1853 to 1929. Other chemical manufacturers, not specified in the available file information, occupied the property and surrounding area from 1929 through 1963. At least one of these companies maintained a waste or storage lagoon near the center of the property [3, p. 2]. The lagoon is evident in aerial photographs taken in 1938, 1954, and 1966 [2, p. 4]. It is unknown when the lagoon was filled in; however, it may have occurred sometime between 1966 and 1980. In 1980, a Site Inspection (SI) of the property completed by Ecology & Environment, Inc./Field Investigation Team (E&E/FIT) stated that the lagoon "has been completely covered with fill" and that "no standing water exists on the property at this time" [2, p. 4].

In April 1983, Stauffer Chemical Company (Stauffer) performed a hydrogeologic assessment of the Industriplex-128 Site. As part of this investigation, six soil borings (B-33, B-34, B-38, B-48, OW-1, and OW-1A) were advanced on the NERP property, two of which (OW-1 and OW-1A) were completed as monitoring wells. Soil samples were screened for volatile organic compounds (VOCs) and analyzed for heavy metals, and did not indicate concentrations above "normal background levels". Groundwater samples were analyzed for metals, cyanide, pH, and conductivity [39, p. 5]. Analytical results of groundwater samples are discussed in further detail in the Groundwater Pathway section of this evaluation.

On 21 May 1986, GZA personnel sampled four wells that were installed as part of a Site Assessment of the NERP property. The results of the analysis indicated that no VOCs other than methane, a naturally occurring by-product of the decay of organic material, were detected [39, p. 15]. In addition, GZA personnel collected an upstream and a downstream surface water sample from the drainage ditch bordering the property to the east. Both samples were screened for VOCs by gas chromatography (GC). Low levels of VOCs including one tentatively identified as toluene were detected in the samples. The VOC concentrations were elevated in the upstream sample compared to the downstream sample. Several potential sources of VOC contamination were identified upstream; therefore, it was GZA's opinion that the source of the VOCs in the drainage ditch was located upstream of the property [41, p. 5].

In August 1991, ATEC, Inc. advanced four soil borings on the NERP property (SB-1 to SB-4). No monitoring wells were installed and no groundwater samples were collected or analyzed. Soil samples were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) metals, VOCs, and total petroleum hydrocarbons (TPHs). VOCs and TPHs were detected in the samples; TCLP metals were not detected in any samples [41, p. 5].

GENERAL INFORMATION (Concluded)

On 9 September 1991, GZA personnel collected groundwater samples from the six wells installed on 3 September 1991 in the area of the former gasoline UST as part of additional sampling and analysis of the property. The samples were submitted for laboratory analysis for VOCs and TPHs. The results and conclusions of the analysis were consistent with the 1986 sampling event [41, p. 6].

On 18 May 1994, GZA collected groundwater samples from the eight existing on-site monitoring wells and collected a surface water sample from the on-site drainage ditch as part of a Site Evaluation Update for the property. The samples were submitted for laboratory analysis for VOCs and TPHs. The analytical results indicated the presence of low concentrations of VOCs [benzene, toluene, ethylbenzene, and xylene (BTEX)] that are common constituents of gasoline [41, p. 24]. Analytical results are discussed in further detail in the Groundwater Pathway section of this evaluation.

On 4 March 1997, START personnel conducted an on-site reconnaissance of the NERP property. START personnel inspected the interior and exterior portions of the property, as well as areas where hazardous substances have been used, stored, and/or generated [37, pp. 1-5].

On 8 July 1997, START personnel attempted to collect groundwater samples from three existing monitoring wells located on the NERP property. Two of the three monitoring wells could not be located due to overgrown vegetation. The third well was dry and could not be sampled [37, pp. 6-9].

On 15 September 1997, START personnel collected three source samples and two soil samples from the NERP property. Samples were collected from two test pits excavated in the former lagoon and from a reference location as part of the Site Inspection Prioritization (SIP) (Figure 3). All samples were analyzed through the EPA Contract Laboratory Program (CLP) for VOCs, semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, and cyanide. The analytical results indicated the presence of VOCs, SVOCs, pesticides/PCBs, and metals in the samples [37, pp. 10-16]. Analytical results of source and soil samples are discussed in further detail in the Source Evaluation section of this evaluation.

START personnel attempted to advance groundwater monitoring wells using a hydraulic sampling device. Refusal was encountered at each location likely due to shallow bedrock and coarse, overburden, fill soils. As a result, START did not collect groundwater samples as part of the NERP SIP [37, pp. 10-16].

SOURCE EVALUATION

Description of each Source: Identify each source area by name and number, and classify each source into a source type category (see SI Table 1). Describe the dimensions of each source. Identify the hazardous substances associated with each source. Determine the containment characteristics for each source by pathway (see HRS Tables 3-2, 4-2, 6-3 and 6-9).

Source No. 1 Former Wastewater Lagoon (Landfill)

A former wastewater lagoon is located near the center of the property. The lagoon is believed to have been used by Merrimac Chemical Company and/or other fertilizer manufacturers on the property [2, p. 2]. A local resident stated that piles of white powder were dumped into the swamp land surrounding the factory. The file information does not indicate to which factory the local resident was referring. Both the former wastewater lagoon and other formerly low-lying areas have been completely covered with fill consisting of sand, gravel, boulders, and building rubble [2, p. 4; 37, pp. 1-4]. This source is available to the Groundwater, Surface Water, Soil Exposure, and Air Migration pathways.

On 15 September 1997, START personnel collected three source samples and two subsurface soil samples from the NERP property. Samples were collected from two test pits excavated in the former lagoon and from a reference location as part of the SIP. Aroclor-1254, heptachlor, dieldrin, phenanthrene, fluoranthene, pyrene, chrysene, barium, calcium, copper, lead, mercury, sodium, and zinc were detected at concentrations greater than three times the reference sample concentration or at concentrations greater than the reference sample's quantitation limit (SQL) (for organic analyses) or sample detection limit (SDL) (for inorganic analyses) [37, pp. 10-16].

Source No. 2 Drums (Drums)

A flammable materials storage shed was located on the property south of the warehouse. In this shed, START personnel documented 12 55-gallon drums of corrosive materials, 46 55-gallon drums of flammable resins, and 20 35-lb tanks of propane. The drums were stored side-by-side on pallets. The floor of the shed was concrete and there were no floor drains. The entrance to the shed was bermed to contain any accidental spills [37, p. 3]. This source is available to the Groundwater, Surface Water, Soil Exposure, and Air Migration pathways.

Source No. 3 Epoxy Resin AST (Tank)

A 5,000-gallon AST containing epoxy resins was located in the southwest corner of the warehouse. The floor of the warehouse was concrete and there were no floor drains. Another square tank surrounding the resin AST provides secondary containment [37, p. 2]. This source is available to the Groundwater, Surface Water, Soil Exposure, and Air Migration pathways.

SOURCE EVALUATION (Continued)

Source No. 4 Propane AST (Tank)

A 500-gallon propane AST was located outside the northwest corner of the warehouse [37, p. 2]. Propane is considered ineligible for evaluation due to Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Petroleum Exclusion Policy, and this source will not be evaluated further.

Source No. 5 Former Gasoline UST (Tank)

A 1,000-gallon UST used for the storage of gasoline was formerly located north of the flammable materials storage shed. According to GZA, the UST was removed in 1983 [41]. Since the UST contained a virgin petroleum product, it is ineligible for evaluation under CERCLA Petroleum Exclusion Policy, and this source will not be evaluated further.

Source No.	Source Type	Pathway Availability			
		GW	SW	SE	A
1	Landfill	Y	Y	Y	Y
2	Drums	Y	Y	Y	Y
3	Tank	Y	Y	Y	Y
4	Tank	I	I	I	I
5	Tank	I	I	I	I

Legend: Y = available to pathway
N = not available to pathway
? = availability unknown
I = ineligible waste

SOURCE EVALUATION (Continued)

Hazardous Waste Quantity (HWQ) Calculations: SI Tables 1 and 2 (See HRS Tables 2-5, 2-6, and 5-2).

For each source, provide HWQ calculations by tier and provide assumptions. Note: HWQ calculations may be different for the soil exposure pathway.

There is insufficient background information to evaluate the following sources on *Tier A (Hazardous Constituent Quantity)* or *Tier B (Hazardous Wastestream Quantity)*.

1. Former Wastewater Lagoon (Landfill)

Tier C (Volume)

Insufficient information is available to evaluate this source on this tier.

Tier D (Area)

The area of the former wastewater lagoon was estimated using an aerial photograph which depicts the lagoon. The scale of the photograph was determined by START using current dimensions of the flammable materials storage shed, which is also included on the aerial photograph [2, p. 3; 37, p. 3]. The area of the former wastewater lagoon is approximately 22,500 square feet (ft²) [43]. From SI Table 1, for multiple source sites, the area of a landfill, in ft², is divided by 3,400 to determine the Source Waste Quantity (WQ).

$$22,500 \text{ ft}^2 \div 3,400 = 6.62$$

$$\text{Source 1 WQ} = 6.62$$

2. Drums (Drums)

Tier C (Volume)

START personnel observed a total of 78 55-gallon drums containing flammable and corrosive hazardous materials in the flammable materials storage shed [37, p. 4]. From SI Table 1, for multiple source sites, the number of drums is divided by 10 to determine the Source WQ.

$$78 \text{ drums} \div 10 = 7.8$$

Tier D (Area)

The "Drums" source type cannot be evaluated on Tier D.

$$\text{Source 2 WQ} = 7.8$$

SOURCE EVALUATION (Concluded)

Source No. 3 Epoxy Resin AST (Tank)

Tier C (Volume)

START observed a 5,000-gallon AST containing epoxy resins was located in the southwest corner of the warehouse [37, p. 2]. From SI Table 1, for multiple source sites, the volume of a tank, in gallons, is divided by 500 to determine the Source WQ.

$$5,000 \text{ gallons} \div 500 = 10$$

Tier D (Area)

The "Tank" source type cannot be evaluated on Tier D.

Source 3 WQ = 10

Source Nos. 1, 2, and 3 are available to the Groundwater, Surface Water, Soil Exposure, and Air Migration pathways. The sum of available WQ values is $6.62 + 7.8 + 10 = 24.42$. Since the Hazardous Constituent Quantity data available for the NERP property are incomplete and the sum of the Source WQ values is between 1 and 100, a Hazardous Waste Quantity (HWQ) value of 10 is assigned to all pathways.

GW HWQ = 10

SW HWQ = 10

SE HWQ = 10

AIR HWQ = 10

SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES

Tier	Source Type	Single Source Sites (assigned HWQ scores)				Multiple Source Sites
		HWQ = 10	HWQ = 100	HWQ = 10,000	HWQ = 1,000,000	Divisors for Assigning Source WQ Values
A Hazardous Constituent Quantity	N/A	HWQ = 1 if Hazardous Constituent Quantity data are complete HWQ = 10 if Hazardous Constituent Quantity data are not complete	>100 to 10,000 lbs	>10,000 to 1 million lbs	> 1 million lbs	lbs ÷ 1
B Hazardous Wastestream Quantity	N/A	≤500,000 lbs	>500,000 to 50 million lbs	>50 million to 5 billion lbs	>5 billion lbs	lbs ÷ 5,000
C Volume	Landfill	≤6.75 million ft ³ ≤250,000 yd ³	>6.75 million to 675 million ft ³ >250,000 to 25 million yd ³	>675 million to 67.5 billion ft ³ >25 million to 2.5 billion yd ³	>67.5 billion ft ³ >2.5 billion yd ³	ft ³ ÷ 67,500 yd ³ ÷ 2,500
	Surface impoundment	≤6,750 ft ³ ≤250 yd ³	>6,750 to 675,000 ft ³ >250 to 25,000 yd ³	>675,000 to 67.5 million ft ³ >25,000 to 2.5 million yd ³	>67.5 million ft ³ >2.5 million yd ³	ft ³ ÷ 67.5 yd ³ ÷ 2.5
	Drums	≤1,000 drums	>1,000 to 100,000 drums	>100,000 to 10 million drums	>10 million drums	drums ÷ 10
	Tanks and non-drum containers	≤50,000 gallons	>50,000 to 5 million gallons	>5 million to 500 million gallons	>500 million gals.	gallons ÷ 500
	Contaminated soil	≤6.75 million ft ³ ≤250,000 yd ³	>6.75 million to 675 million ft ³ >250,000 to 25 million yd ³	>675 million to 67.5 billion ft ³ >25 million to 2.5 billion yd ³	>67.5 billion ft ³ >2.5 billion yd ³	ft ³ ÷ 67,500 yd ³ ÷ 2,500
	Pile	≤6,750 ft ³ ≤250 yd ³	>6,750 to 675,000 ft ³ >250 to 25,000 yd ³	>675,000 to 67.5 million ft ³ >25,000 to 2.5 million yd ³	>67.5 million ft ³ >2.5 million yd ³	ft ³ ÷ 67.5 yd ³ ÷ 2.5
	Other	≤6,750 ft ³ ≤250 yd ³	>6,750 to 675,000 ft ³ >250 to 25,000 yd ³	>675,000 to 67.5 million ft ³ >25,000 to 2.5 million yd ³	>67.5 million ft ³ >2.5 million yd ³	ft ³ ÷ 67.5 yd ³ ÷ 2.5

SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES

Tier	Source Type	Single Source Sites (assigned HWQ scores)				Multiple Source Sites
		HWQ = 10	HWQ = 100	HWQ = 10,000	HWQ = 1,000,000	Divisors for Assigning Source WQ Values
D Area	Landfill	$\leq 340,000 \text{ ft}^2$ $\leq 7.8 \text{ acres}$	$> 340,000 \text{ to } 34 \text{ million ft}^2$ $> 7.8 \text{ to } 780 \text{ acres}$	$> 34 \text{ million to } 3.4 \text{ bil. ft}^2$ $> 780 \text{ to } 78,000 \text{ acres}$	$> 3.4 \text{ billion ft}^2$ $> 78,000 \text{ acres}$	$\text{ft}^2 \div 3,400$ $\text{acres} \div 0.078$
	Surface Impoundment	$\leq 1,300 \text{ ft}^2$ $\leq 0.029 \text{ acres}$	$> 1,300 \text{ to } 130,000 \text{ ft}^2$ $> 0.029 \text{ to } 2.9 \text{ acres}$	$> 130,000 \text{ to } 13 \text{ million ft}^2$ $> 2.9 \text{ to } 290 \text{ acres}$	$> 13 \text{ million ft}^2$ $> 290 \text{ acres}$	$\text{ft}^2 \div 13$ $\text{acres} \div 0.00029$
	Contaminated Soil	$\leq 3.4 \text{ million ft}^2$ $\leq 78 \text{ acres}$	$> 3.4 \text{ million to } 340 \text{ million ft}^2$ $> 78 \text{ to } 7,800 \text{ acres}$	$> 340 \text{ million to } 34 \text{ bil. ft}^2$ $> 7,800 \text{ to } 780,000 \text{ acres}$	$> 34 \text{ billion ft}^2$ $> 780,000 \text{ acres}$	$\text{ft}^2 \div 34,000$ $\text{acres} \div 0.78$
	Pile	$\leq 1,300 \text{ ft}^2$ $\leq 0.029 \text{ acres}$	$> 1,300 \text{ to } 130,000 \text{ ft}^2$ $> 0.029 \text{ to } 2.9 \text{ acres}$	$> 130,000 \text{ to } 13 \text{ million ft}^2$ $> 2.9 \text{ to } 290 \text{ acres}$	$> 13 \text{ million ft}^2$ $> 290 \text{ acres}$	$\text{ft}^2 \div 13$ $\text{acres} \div 0.00029$
	Land treatment	$\leq 27,000 \text{ ft}^2$ $\leq 0.62 \text{ acres}$	$> 27,000 \text{ to } 2.7 \text{ million ft}^2$ $> 0.62 \text{ to } 62 \text{ acres}$	$> 2.7 \text{ mil. to } 270 \text{ million ft}^2$ $> 62 \text{ to } 6,200 \text{ acres}$	$> 270 \text{ million ft}^2$ $> 6,200 \text{ acres}$	$\text{ft}^2 \div 270$ $\text{acres} \div 0.0062$

1 ton = 2,000 lbs = 1 yd³ = 4 drums = 200 gallons

SI TABLE 2: HWQ SCORES FOR MULTIPLE SOURCE SITES

Site WQ Total	HWQ Score
0	0
1 ^a to 100	1 ^b
>100 to 10,000	100
>10,000 to 1,000,000	10,000
>1,000,000	1,000,000

^aIf the HWQ total is between 0 and 1, round it to 1.

^bIf the hazardous constituent quantity data are not complete, assign the score of 10.

SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

Enter "NA" for substances which are not available to a pathway.

Enter "NL" for substance values not listed in SCDM.

Provide footnote for substances listed in table but not used for scoring purposes
(e.g. BTEX substances attributable to a gasoline tank).

Sources:

1. Former Wastewater Lagoon

2. Drums

3. Epoxy Resin AST

Source	Hazardous Substance	Toxicity	GROUNDWATER PATHWAY		SURFACE WATER PATHWAY OVERLAND/FLOOD MIGRATION							
			GW Mobility (HRS Table 3-8)	Tox. × Mobility Value (HRS Table 3-9)	Pers. (HRS Tables 4-10 and 4-11)	Tox. × Pers. Value (HRS Table 4-12)	Bioacc. Pot. (HRS Table 4-15)	Tox. × Pers. × Bioacc. Value (HRS Table 4-16)	Ecotox. (HRS Table 4-19)	Ecotox. × Pers. (HRS Table 4-20)	Eco. Bioacc. Pot. (HRS Table 4-20)	Ecotox. × Pers. × Eco. Bioacc. Value (HRS 4-21)
1	Barium	10,000	0.01	100	1	10,000	0.5	5,000	1	1	0.5	0.5
1	Bis(2-ethylhexyl)phthalate	100	0.0001	0.01	1	100	50,000	5E+06	1,000	1,000	50,000	5E+07
1	Bis(pentafluorophenyl)phosphine	NL	NL	--	NL	--	NL	--	NL	--	NL	--
2	Butyl glycidyl ether	NL	NA	--	NA	--	--	--	--	--	--	--
1	Butanone, 2- (MEK)	10	1	10	0.4	4	0.5	2	1	0.4	0.5	0.2
1	Calcium	NL	1	--	1	--	500	--	NL	--	500	--
1	Chrysene	10	0.01	0.1	1	10	500	5,000	1,000	1,000	5,000	5E+06
1	Copper	NL	0.01	--	1	--	50,000	--	100	100	50,000	5E+06
1	Dieldrin	10,000	0.01	100	1	10,000	50,000	5E+08	10,000	10,000	50,000	5E+08
1	Ethylbenzene	10	1	10	0.4	4	50	200	100	40	50	2,000
1	Fluoranthene	100	0.01	1	1	100	5,000	5E+05	10,000	10,000	500	5E+06
1	Heptachlor	1,000	0.0001	0.1	1	1,000	5,000	5E+06	10,000	10,000	50,000	5E+08
2	Isopropyl alcohol	NL	NA	--	NA	--	--	--	--	--	--	--
1	Lead	10,000	0.01	100	1	10,000	50	5E+05	1,000	1,000	5,000	5E+06
BCF												

SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET
(Continued)

Sources:

1. Former Wastewater Lagoon

2. Drums

3. Epoxy Resin AST

Source	Hazardous Substance	Toxicity	GROUNDWATER PATHWAY		SURFACE WATER PATHWAY OVERLAND/FLOOD MIGRATION							
			GW Mobility (HRS Table 3-8)	Tox. × Mobility Value (HRS Table 3-9)	Pers. (HRS Tables 4-10 and 4-11)	Tox. × Pers. Value (HRS Table 4-12)	Bioacc. Pot. (HRS Table 4-15)	Tox. × Pers. × Bioacc. Value (HRS Table 4-16)	Ecotox. (HRS Table 4-19)	Ecotox. × Pers. (HRS Table 4-20)	Eco. Bioacc. Pot. (HRS Table 4-20)	Ecotox. × Pers. × Eco. Bioacc. Value (HRS Table 4-21)
1	Mercury	10,000	0.01	100	0.4	4,000	50,000	2E+08	10,000	4,000	50,000	2E+08
1	Nickel	10,000	0.01	100	1	10,000	0.5	5,000	10	10	500	5,000
1	PCBs (Aroclor-1254)	10,000	0.0001	1	1	10,000	50,000	5E+08	10,000	10,000	50,000	5E+08
1	Phenanthrene	NL	0.01	--	1	--	50	--	1,000	1,000	5,000	5E+06
1	Pyrene	100	0.01	1	1	100	50	5,000	10,000	10,000	50	5E+05
1	Sodium	NL	0.01	--	1	--	0.5	--	NL	--	0.5	--
2	Trimethylbenzene, 1,2,4-	NL	NA	--	NA	--	--	--	--	--	--	--
1	Xylene, total	10	1	10	0.4	4	50	200	100	40	50	2,000
1	Zinc	10	0.01	0.1	1	10	500	5,000	10	10	500	5,000
							BCF					

SCDM Version: JUN96

References: 39, p. 5

Notes: SCDM values for liquid wastes disposed of in non-karst terrain, and fresh water rivers were used.
Particulate mobility factor = 0.00008 based on HRS Figure 6-3.
Epoxy resin is not listed in SCDM.

**SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET
(Continued)**

Sources:

1. Former Wastewater Lagoon

2. Drums

3. Epoxy Resin AST

Source	Hazardous Substance	Toxicity	SURFACE WATER PATHWAY GROUNDWATER TO SURFACE WATER				AIR PATHWAY		
			Tox. × Mob. × Pers. Value (HRS Table 4-26)	Tox. × Mob. × Pers. × Bioacc. Value (HRS Table 4-28)	Ecotox. × Mob. × Pers. Value (HRS Table 4-29)	Ecotox. × Mob. × Pers. × Bioacc. Value (HRS Table 4-30)	Gaseous/ Particulate (HRS Table 6-13) (indicate G or P)	Mobility (HRS Table 6-11, 6-12)	Tox. × Mob. Value (HRS Table 6-13)
1	Barium	10,000	100	50	0.01	0.005	P	8E-05	0.8
1	Bis(2-ethylhexyl)phthalate	100	0.01	500	0.1	5,000	G/P	0.002	0.2
1	Bis(pentafluorophenyl)phosphine	NL	NL	--	NL	--	NL	NL	--
2	Butyl glycidyl ether	NL	NA	--	--	--	NL	NL	--
1	Butanone, 2- (MEK)	10	4	2	0.4	0.2	G	1	10
1	Calcium	NL	--	--	--	--	P	8E-05	--
1	Chrysene	10	0.1	50	10	50,000	G/P	0.0002	0.002
1	Copper	NL	--	--	1	50,000	P	8E-05	--
1	Dieldrin	10,000	100	5E+06	100	5E+06	G/P	0.002	20
1	Ethylbenzene	10	4	200	40	2,000	G	1	10
1	Fluoranthene	100	1	5,000	100	50,000	G/P	0.002	0.2
1	Heptachlor	1,000	0.1	500	1	50,000	G/P	0.02	20
2	Isopropyl alcohol	NL	NA	--	--	--	NL	NL	--
1	Lead	10,000	100	5,000	10	50,000	P	8E-05	0.8
1	Mercury	10,000	40	2E+06	40	2E+06	G/P	0.2	2,000

SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET (Concluded)

Sources:

1. Former Wastewater Lagoon

2. Drums

3. Epoxy Resin AST

Source	Hazardous Substance	Toxicity	SURFACE WATER PATHWAY GROUNDWATER TO SURFACE WATER				AIR PATHWAY		
			Tox. × Mob. × Pers. Value (HRS Table 4-26)	Tox. × Mob. × Pers. × Bioacc. Value (HRS Table 4-28)	Ecotox. × Mob. × Pers. Value (HRS Table 4-29)	Ecotox. × Mob. × Pers. × Bioacc. Value (HRS Table 4-30)	Gaseous/ Particulate (HRS Table 6-13) (indicate G or P)	Mobility (HRS Table 6-11, 6-12)	Tox. × Mob. Value (HRS Table 6-13)
1	Nickel	10,000	100	50	0.1	50	P	8E-05	0.8
1	PCBs (Aroclor-1254)	10,000	1	50,000	1	50,000	G/P	0.02	200
1	Phenanthrene	NL	--	--	10	50,000	G/P	0.02	--
1	Pyrene	100	1	50	100	5,000	G/P	0.002	0.2
1	Sodium	NL	--	--	--	--	P	8E-05	--
2	Trimethylbenzene, 1,2,4-	NL	NA	--	--	--	NL	NL	--
1	Xylene, total	10	4	200	40	2,000	G	1	10
1	Zinc	10	0.1	50	0.1	50	P	8E-05	0.0008

SCDM Version: JUN96

References: 39, p. 2

Notes: SCDM values for liquid wastes disposed of in non-karst terrain, and fresh water rivers were used.

Particulate mobility factor = 0.00008 based on HRS Figure 6-3.

Epoxy resin is not listed in SCDM.

GROUNDWATER PATHWAY

Pathway Description and Scoring Notes: Describe the Groundwater Migration Pathway. Include the names and brief descriptions of the aquifers underlying the site, the depth to groundwater, the locations of the nearest private and public drinking water supplies and the aquifers from which they draw, and the population relying upon groundwater drawn from within 4 miles of the site for their drinking water supplies.

- Briefly discuss any sampling events relative to the Groundwater Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.
- Indicate any assumptions you have made in scoring the Groundwater Pathway for this site, or any key factors which influence your scoring rationale.

Approximately 60% of the property is covered by asphalt paving or buildings [37, p. 4]. Soils on the property are fill materials consisting of sand, gravel, boulders, and demolition debris [2, Appendix B, p. 9]. The mean annual precipitation for Reading, Massachusetts, approximately 1 mile east of the property, is 46.64 inches [25].

Bedrock beneath the property consists of metamorphosed mafic-to-felsic flow and volcaniclastic and hypabyssal intrusive rocks [12]. Groundwater occurs in overburden beneath the property at a depth of approximately 15 feet (ft) below ground surface (bgs). Groundwater flow beneath the property is to the southeast [2, Appendix B, p. 8]. Groundwater discharge to surface water is to the drainage ditch, which discharges to the Aberjona River, based on the property location being within the Aberjona River Watershed [18].

All or part of the following Massachusetts cities and towns are located within 4-radial miles of the NERP property: Burlington (population 23,301); Reading (population 22,671); Stoneham (population 22,183); Wilmington (population 18,488); and Woburn (population 36,407) [7-10; 26].

The nearest public groundwater drinking water supply well is the Wilmington Water Department Main Street Well, which is located approximately 0.6 miles northwest and upgradient of the property [26; 27]. Municipal water in Wilmington is supplied by eight groundwater wells located throughout the town. Water from these wells is blended before distribution [27]. Six of these wells are located within 4-radial miles of the property. Since no single source in the system contributes more than 40% of the water to the total system, the 18,488 persons served by the system are apportioned evenly among the eight sources [27; 32].

Municipal water in Woburn is supplied by six wells located near Horn Pond, two of which are located within 4-radial miles of the property. An additional two million gallons of water per day are supplied to the City of Woburn Water Department by the Massachusetts Water Resource Authority (MWRA). The MWRA receives water from the Quabbin Reservoir, located beyond 4-radial miles from the property. The Woburn municipal wells are situated approximately 3.7 miles south-southwest of the property [20]. Since no single source in the system contributes more than 40% of the water to the total system, the 36,407 persons served by the system are apportioned evenly among the seven sources [20; 31].

Municipal water in Stoneham is supplied 100% by the MWRA [30].

GROUNDWATER PATHWAY (Continued)

Municipal water in Reading is supplied by nine groundwater wells, eight of which are located off of Strout Avenue and the other is located at the end of Beverly Road. All of the wells are located within 4-radial miles of the property. Since no single source in the system contributes more than 40% of the water to the total system, the 22,671 persons served by the system are apportioned evenly among the nine sources [29; 33].

Municipal water in Burlington is a blended system supplied by five groundwater wells and the Mill Pond Reservoir. None of the drinking water sources are located within 4-radial miles of the property [28]. The following table summarizes the populations which rely on public groundwater sources for drinking water within 4-radial miles of the property.

**Public Groundwater Supply Sources Within 4 Radial Miles of
New England Resins & Pigments**

Distance/Direction From Site	Source Name	Location of Source ^a	Est. Pop. Served	Source Type ^b
(b) (9)				

^a Indicates town in which well is located

^b Overburden, Bedrock, or Unknown

[19; 23; 25; 27-29]

Private groundwater supplies located within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying population, households, and private water wells for "Block Groups" which lie within or partially within individual radial distance rings measured from the NERP property. The nearest private groundwater water drinking water supply well is estimated to be located between 0.25- and 0.5-radial miles from the property, but has not been specifically identified due to lack of private well information for Woburn and Wilmington [6]. The total population which relies on public and private groundwater drinking water supplies within 4-radial miles of the property is estimated at 48,075 persons and is summarized in the following table.

GROUNDWATER PATHWAY (Continued)
Estimated Drinking Water Populations Served By Groundwater Sources
Within 4-Radial Miles of New England Resins & Pigments

Radial Distance from New England Resins & Pigments (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
≥ 0.00 to 0.25	0	0	0
> 0.25 to 0.50	1	0	1
> 0.50 to 1.00	37	2,311	2,348
> 1.00 to 2.00	194	11,763	11,957
> 2.00 to 3.00	364	20,152	20,516
> 3.00 to 4.00	540	12,713	13,253
TOTAL	1,136	46,939	48,075

[6; 20; 27; 29; 31-33]

In April 1983, Stauffer personnel collected groundwater samples from two monitoring wells that were installed on NERP property (OW-1 and OW-1A). The samples were analyzed for metals, cyanide, pH, and conductivity. The Stauffer report did not indicate if the samples analyzed for metals had been filtered, nor did it discuss the availability of a reference sample. The results of the analyses indicated that pH and conductivity were within the normal range for developed areas of New England. Cyanide was not detected in either sample. Cadmium and zinc were detected, but at concentrations below Massachusetts Department of Environmental Protection (MA DEP) drinking water standards. Nickel was present in well OW-1A at a concentration of 100 parts per billion (ppb). Two extractable organic compounds, bis(pentafluorophenol)phosphine and bis(2-ethylhexyl)phthalate, were detected in well OW-1A at concentrations of 31 ppb and 14 ppb, respectively. The Stauffer report does not indicate whether an extractable analysis was performed; therefore, the source of the results for the two extractable organic compounds detected is unknown [39, p. 5].

On 21 May 1986, GZA personnel collected groundwater samples from four monitoring wells (GZ-1, GZ-3, GZ-4, and GZ-5) that were installed as part of a Site Assessment of the NERP property. The samples were analyzed for VOCs. The results of the analysis indicated that no VOCs other than methane, a naturally occurring by-product of the decay of organic material, were detected [39, p. 15].

On 9 September 1991, GZA personnel collected groundwater samples from the six wells installed on 3 September 1991 (GZ-6, GZ-8, and GZ-10 through GZ-13) in the area of the former gasoline UST as part of additional sampling and analysis of the property. The samples were submitted for VOC and TPH analysis [40, p. 5]. Concentrations of gasoline constituents [benzene, toluene, ethylbenzene, xylenes (BTEX)] were detected in the samples at levels below the MA DEP standards for public drinking water supplies. No TPHs were detected in the samples [41, p. 6].

GROUNDWATER PATHWAY (Concluded)

On 18 May 1994, GZA collected groundwater samples from the eight existing monitoring wells as part of a Site Evaluation Update for the property. Monitoring wells GZ-1 and GZ-8 were destroyed due to property renovations. Samples were analyzed for VOCs and TPH. The results indicated low concentrations of VOCs commonly found in gasoline (BTEX) in monitoring wells downgradient of the former gasoline UST. The highest concentrations of these VOCs included benzene (160 ppb), toluene (60 ppb), ethylbenzene (240 ppb), and xylene (290 ppb) [41, Table 4]. No other compounds were detected in the groundwater samples [41, p. 24]. The VOC concentrations are below the Massachusetts Contingency Plan (MCP) reportable concentrations for groundwater category 2 (RCGW-2) [47]. No information currently available indicates that this groundwater contamination has a source other than the gasoline UST. As a result, the presence of these VOCs in groundwater is considered ineligible for evaluation as part of the START SIP due to the CERCLA Petroleum Exclusion Policy, and will not be evaluated.

On 8 July 1997, START personnel attempted to collect groundwater samples from three existing monitoring wells located on the NERP property. Two of the three monitoring wells could not be located due to overgrown vegetation. The third well was dry and could not be sampled [37, pp. 6-9].

On 15 September 1997, START personnel attempted to advance groundwater monitoring wells using a hydraulic sampling device. Refusal was encountered at each location likely due to shallow bedrock and coarse, overburden, fill soils. As a result, START did not collect groundwater samples during this sampling event [37, pp. 10-16].

Despite two attempts, START was unable to collect groundwater samples as part of the NERP SIP due to technical difficulties encountered during the site visits. Based on the results of previous sampling events, a release of VOCs to groundwater has occurred on site. The nearest drinking water supply wells are located more than a quarter mile from the property, and are not known or suspected to be impacted by hazardous substances associated with the property.

SI TABLE 4: GROUNDWATER OBSERVED RELEASE SUBSTANCES (BY AQUIFER)

Note: Mobility equals 1 for all observed release substances.

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	Tox. × Mob. = Tox.	References
None.						
Highest Value						

Notes: VOCs commonly found in gasoline have been detected in groundwater beneath the NERP property. However, because the only known source for these compounds is the virgin gasoline UST, the VOCs will not be evaluated as observed release substances, pursuant to the Petroleum Exclusion Policy.

SI TABLE 5: GROUNDWATER ACTUAL CONTAMINATION TARGETS

Notes: Convert all results and SCDM values to ppb or µg/L.

If sum of percents calculated for I or J index is ≥ 100%, consider the well a Level I target; if sum of I or J index is < 100%, consider the well a Level II target.

Well ID: Level I: Level II: Population Served: References:

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	RfD (J Index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
None.								
Highest Percent					Sum of Percents		Sum of Percents	

SCDM Version: JUN96

Notes: No known groundwater actual contamination targets have been identified to date.

GROUNDWATER PATHWAY WORKSHEET

LIKELIHOOD OF RELEASE		Score	Data Type	Refs
1.	OBSERVED RELEASE: If sampling data or direct observation support a release to the aquifer, assign a score of 550. Record observed release substances on SI Table 4.			
2.	POTENTIAL TO RELEASE: Depth to aquifer: <u>15</u> ft. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 ft or less, assign a score of 500; otherwise, assign a score of 340. Optionally, evaluate potential to release according to HRS Section 3.1.2.	500	+	2
LR =		500		

TARGETS		Score	Data Type	Refs
Are any wells part of a blended system? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, attach a page to show apportionment calculations. See pp. 18-20.			+	20: 27; 29
3.	ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates that any target drinking water well for the aquifer has been exposed to a hazardous substance from the site, evaluate the factor score for the number of people served (SI Table 5). Level I: $\frac{0}{0} \text{ people} \times 10 = \frac{0}{0}$ Level II: $\frac{0}{0} \text{ people} \times 1 = \frac{0}{0}$ Total =	0	+	20: 27; 29
4.	POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water wells for the aquifer or overlying aquifers that are not exposed to a hazardous substance from the site; record the population for each distance category in SI Table 6a or 6b. Sum the population values and multiply by 0.1.	689.2	+	6: 31; 32: 33
5.	NEAREST WELL: Assign a score of 50 for any Level I Actual Contamination Targets for the aquifer or overlying aquifer. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Targets exist, assign the Nearest Well Score from SI Table 6a or 6b. If no drinking water wells exist within 4 miles, assign 0.	18	+	6
6.	WELLHEAD PROTECTION AREA (WHPA): If any source lies within or above a WHPA for the aquifer, or if a groundwater observed release has occurred within a WHPA, assign a score of 20; assign 5 if neither condition applies but a WHPA is within 4 miles; otherwise assign 0.	5	+	21-23
7.	RESOURCES: Assign a score of 5 if one or more groundwater resource applies; assign 0 if none applies. <ul style="list-style-type: none"> • Irrigation (5 acre minimum) of commercial food crops or commercial forage crops • Watering or commercial livestock • Ingredient in commercial food preparation • Supply for commercial aquaculture • Supply for a major or designated water recreation area, excluding drinking water use 	5	-	
Sum of Targets T =		717.2		

Notes: Resources value is assumed.

**SI TABLE 6 (FROM HRS TABLE 3-12): VALUES FOR POTENTIAL CONTAMINATION GROUNDWATER
TARGET POPULATIONS**

SI Table 6a: Other Than Karst Aquifers

Distance From Site	Pop.	Nearest Well (choose highest)	POPULATION SERVED BY WELLS WITHIN DISTANCE CATEGORY												Pop. Value	Ref.
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000		
0 to 1/4 mile	0	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	0	6
> 1/4 to 1/2 mile	1	18	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122	2	6
> 1/2 to 1 mile	2,348	9	1	5	17	52	167	523	1,669	5,224	16,684	52,239	166,835	522,385	523	6; 32
> 1 to 2 miles	11,957	5	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842	2,939	6; 32; 33
> 2 to 3 miles	20,516	3	0.5	2	7	21	68	212	678	2,122	6,778	21,222	67,777	212,219	2,122	6; 33
> 3 to 4 miles	13,253	2	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596	1,306	6; 31; 32
Nearest Well =		18													Sum =	6,892

Notes:

GROUNDWATER PATHWAY WORKSHEET (Concluded)

WASTE CHARACTERISTICS	Score	Data Type	Does Not Apply
8. If any Actual Contamination Targets exist for the aquifer or overlying aquifers, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to groundwater.	10	+	
9. Assign the highest groundwater toxicity × mobility value from SI Table 3 or 4. Substance(s): <u>Nickel</u> <u>Barium</u> <u>Lead</u> Value: <u>100</u> <u>100</u> <u>100</u> From Table: <u>3</u> <u>3</u> <u>3</u>	100	+	
10. Multiply the groundwater toxicity × mobility and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below: (from HRS Table 2-7)	1,000		

Product	WC Score	*
0	0	
>0 to <10	1	
≥ 10 to <100	2	
≥ 100 to <1,000	3	
≥ 1,000 to <10,000	6	✓
≥ 10,000 to <1E+05	10	
≥ 1E+05 to <1E+06	18	
≥ 1E+06 to <1E+07	32	
≥ 1E+07 to <1E+08	56	
≥ 1E+08 or greater	100	

*check (✓) the WC score calculated for the pathway

WC =

6

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the groundwater pathway score for each aquifer. Select the highest aquifer score. If the pathway score is greater than 100, assign 100.

GROUNDWATER PATHWAY CALCULATION:

$$\frac{LR \times T \times WC}{82,500} =$$

26.08

Notes: $(500 \times 717.2 \times 6) \div 82,500 = 26.08$

(Maximum of 100)

Previous scoring scenario: If the former wastewater lagoon is scored as a surface impoundment, the HWQ would increase to 100, the WC would increase to 10, and the groundwater pathway score would increase to 43.47.

SURFACE WATER PATHWAY

Pathway Description and Scoring Notes: Describe the Surface Water Migration Pathway. Identify the nearest source area with non-zero containment for the Surface Water Pathway and the location of the PPE. Include the length of the overland segment. Describe the in-water segment up to the target distance limit noting the stream flow characteristics of each reach and the locations of drinking water intakes, fisheries and sensitive environments along the 15-mile pathway.

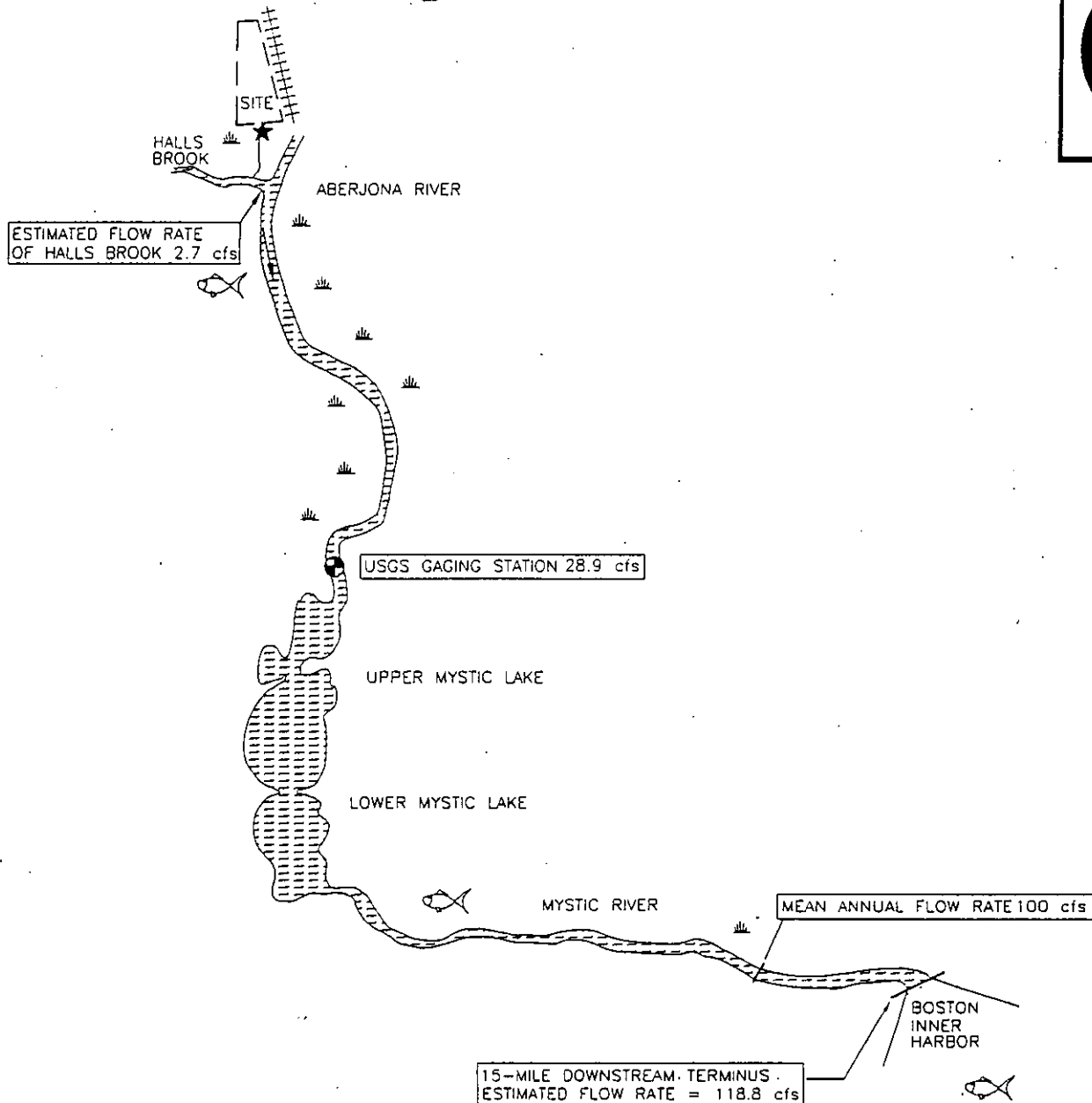
Briefly discuss any sampling events relative to the Surface Water Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Surface Water Pathway for this site, or any factors which influenced your scoring rationale.

Note: If a site has more than one watershed or has both overland/flood and groundwater to surface water migration potential, document each scenario and use the higher scoring watershed/migration route to calculate the surface water migration pathway score. Provide a summary of the scores for all other watershed/migration routes.

Stormwater runoff from the NERP property flows into a drainage ditch, located along the eastern boundary of the property adjacent to the Boston & Maine railroad tracks. The drainage ditch, which START has determined to be a permanent water body, discharges to Halls Brook approximately 3,000 ft south of the property. Halls Brook discharges in a southerly direction to the Aberjona River approximately 2 miles southeast of the property. The Aberjona River then flows south for 5.6 miles and discharges to Upper and Lower Mystic Lake. Surface water continues to flow south for 6.5 miles with the Mystic River, and discharges to Boston Inner Harbor for the final 0.9 miles of the 15-mile downstream surface water pathway (Figure 4) [37; 41, p. 2].

The flow rates of the water bodies along the surface water pathway were calculated by multiplying the drainage basin area of water bodies along the 15-mile downstream surface water pathway by the U.S. Geological Survey (USGS) estimating factor of 1.8 cubic ft per second (cfs)/mi². This factor is an estimate and average of the intensity, rate, and frequency of overland flow in New England. The flow rate for the drainage ditch is estimated to be 0.9 cfs at the probable point of entry (PPE) to the confluence with Halls Brook [38]. The flow rate for Halls Brook was estimated at 2.7 cfs, based on the drainage basin area at its confluence with the Aberjona River [38]. The Aberjona River has a flow rate of less than 28.9 cfs [34]. The flow rate for the Mystic River was estimated to be between 28.9 cfs and 118.8 cfs. A flow rate of 100 cfs occurs along the Mystic river at a point approximately 12.75 miles downstream of the PPE [34; 38]. A USGS gaging station, located approximately 4.5 miles downstream of the PPE, has a recorded mean annual flow rate of 28.9 cfs; no additional USGS gaging stations are located on the Aberjona or Mystic River [34].



SURFACE WATER



WETLANDS



FISHERY

cfs = CUBIC FEET PER SECOND

LEGEND



FLOW DIRECTION



PROBABLE POINT OF
ENTRY TO SURFACE
WATER



GAGING STATION

SURFACE WATER PATHWAY SKETCH
NEW ENGLAND RESINS & PIGMENTS
316 NEW BOSTON STREET
WOBURN, MASSACHUSETTS



REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TOD #
01-08-0017

DRAWN BY:
M.H.

DATE
4/16/1997

FILE NAME:
S:\01080017\FIG3.DWG

FIGURE 3

SURFACE WATER PATHWAY (Continued)

The following table summarizes the characteristics of surface water bodies located along the 15-mile downstream surface water pathway from the property.

Surface Water Bodies Along the 15-Mile Downstream Pathway from New England Resins & Pigments

Surface Water Body	Descriptor ^a	Length of Reach (miles)	Flow Characteristics (cfs) ^b	Wetland Frontage
Drainage Ditch	Minimal stream	0 to 1	0.9	0
Halls Brook	Minimal stream	.1 to 2	2.7	0
Aberjona River	Small to moderate stream	2 to 7.6	< 28.9	2.6
Mystic River (Reach 1)	Small to moderate stream	7.6 to 12.75	28.9 to 100	0.2
Mystic River (Reach 2)	Moderate to large stream	12.75 to 14.1	> 100 to 118.8	0
Boston Inner Harbor	Coastal tidal waters	14.1 to 15	NA	0

^a Minimal stream < 10 cfs. Small to moderate stream 10-100 cfs. Moderate to large stream > 100-1,000 cfs. Large stream to river > 1,000-10,000 cfs. Large river > 10,000-100,000 cfs. Very large river > 100,000 cfs. Coastal tidal waters (flow not applicable).

^b Cubic ft per second.

[7; 10; 13-16; 34; 38]

No surface water drinking water intakes are located along the 15-mile downstream pathway of the NERP property [35]. All surface water bodies located downstream of the PPE are protected under the Clean Water Act (CWA), with the exception of the drainage ditch. Halls Brook and the Aberjona and Mystic Rivers are designated as Class B waterways by the MADEP along their entire lengths. Class B waterways are defined as "waters designated as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary recreation." These rivers are further denoted as warm water fisheries along their entire lengths [42]. Approximately 2.8 miles of wetland frontage exist along the 15-mile downstream pathway from the property [13-16]. Habitats for seven State-threatened species, one State-endangered species, and one Federally-endangered species are located along Halls Brook and the Aberjona and Mystic Rivers along the 15-mile downstream pathway from the property [36]. The following table summarizes the sensitive environments along the 15-mile downstream pathway from the property.

Sensitive Environments Along the 15-Mile Downstream Pathway from New England Resins & Pigments

Sensitive Environment Name	Sensitive Environment Type	Surface Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs)
Halls Brook	Water body protected under CWA	Halls Brook	1.0	2.7
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	3.93	<28.9

SURFACE WATER PATHWAY (Continued)

Sensitive Environments Along the 15-Mile Downstream Pathway from New England Resins & Pigments (Concluded)

Sensitive Environment Name	Sensitive Environment Type	Surface Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs)
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	4.13	< 28.9
Invertebrates Insecta	State-threatened Species Habitat	Aberjona River	4.17	< 28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	4.17	< 28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	4.22	< 28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	4.28	< 28.9
Vascular Plants Dicotyledoneae	State-threatened Species Habitat	Aberjona River	4.43	< 28.9
Vertebrates Aves	Federally-endangered Species Habitat	Mystic River (Reach 1)	12.08	28.9 to 100
Vertebrates Aves	State-endangered Species Habitat	Mystic River (Reach 2)	12.96	> 100 to 118.8
Migratory Pathway for Alewife	Anadromous Fish Migratory Pathway	Boston Inner Harbor	14.40	NA
Spawning Ground for Alewife	Spawning Ground Within an Estuary	Boston Inner Harbor	14.40	NA
Aberjona River Wetlands	2.6 Miles Wetlands	Aberjona River	1 to 7.6	< 28.9
Mystic River Wetlands	0.2 Miles Wetlands	Mystic River (Reach 1)	7.6 to 12.75	28.9 to 100

cfs = Cubic Feet Per Second

PPE = Probable Point of Entry

CWA = Clean Water Act

NA = Not Applicable

[36; 44]

SURFACE WATER PATHWAY (Concluded)

On 21 May 1986, GZA personnel collected an upstream and a downstream surface water sample from the drainage ditch bordering the property to the east. Both samples were screened for VOCs using GC. Low levels of VOCs including one tentatively identified as toluene were detected in the samples. The VOC concentrations were elevated in the upstream sample compared to the downstream sample. Several potential sources of VOC contamination were identified upstream; therefore, it was GZA's opinion that the source of the VOCs in the drainage ditch was located upstream of the property [41, p. 5].

GZA personnel collected additional surface water samples from the drainage ditch in 1991 and 1994. The samples were again screened for VOCs using GC. The results and conclusions of the analysis were consistent with the 1986 sampling event [40; 41].

START did not perform Surface Water Pathway sampling as part of the NERP SIP. Based on the results of previous sampling events, neither a release to surface water from on-site sources nor impacts to sensitive environments are known or suspected.

SI TABLE 7: SURFACE WATER OBSERVED RELEASE SUBSTANCES

List all substances that meet the criteria for an observed release to surface water; however do not eliminate a substance from this table if it has a BCF of less than 500.

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	BCF HRS Table 4-15	Toxicity × Persistence	Toxicity × Persis. × Bioaccum	Ecotoxicity × Persis. × Ecobioaccum	References
None.									
Highest Values									

Notes: Samples collected from the on-site drainage ditch did not indicate an observed release of VOCs to surface water [40; 41].

SI TABLE 8: SURFACE WATER DRINKING WATER ACTUAL CONTAMINATION TARGETS

Notes: Convert all results and SCDM values to ppb or µg/L.

If sum of percents calculated for I or J index is ≥ 100 percent, consider the intake a Level I target; if sum of I or J index is < 100 percent consider the intake a Level II target.

Intake ID: Sample Type: Level I: Level II: Population Served: References:

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	RfD (J Index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
None.								
Highest Percent					Sum of Percents		Sum of Percents	

SCDM Version: JUN96

Notes: No surface water drinking water intakes are located downstream of the property [35].

SURFACE WATER PATHWAY LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET

LIKELIHOOD OF RELEASE - OVERLAND/FLOOD MIGRATION

LIKELIHOOD OF RELEASE - OVERLAND/FLOOD MIGRATION		Score	Data Type	Refs												
1.	OBSERVED RELEASE: If sampling data or direct observation support a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.															
2.	POTENTIAL TO RELEASE: Distance to surface water: <u>200</u> (ft) If sampling data do not support a release to surface water in the watershed, use the table below to assign a score from the table below based on distance to surface water and flood frequency. <table border="1"><tr><td>Distance to surface water <2500 ft</td><td>500</td></tr><tr><td>Distance to surface water >2500 ft, and:</td><td></td></tr><tr><td>Site in annual or 10-yr floodplain</td><td>500</td></tr><tr><td>Site in 100-yr floodplain</td><td>400</td></tr><tr><td>Site in 500-yr floodplain</td><td>300</td></tr><tr><td>Site outside 500-yr floodplain</td><td>100</td></tr></table>	Distance to surface water <2500 ft	500	Distance to surface water >2500 ft, and:		Site in annual or 10-yr floodplain	500	Site in 100-yr floodplain	400	Site in 500-yr floodplain	300	Site outside 500-yr floodplain	100	500	+	10; 24
Distance to surface water <2500 ft	500															
Distance to surface water >2500 ft, and:																
Site in annual or 10-yr floodplain	500															
Site in 100-yr floodplain	400															
Site in 500-yr floodplain	300															
Site outside 500-yr floodplain	100															
Optionally, evaluate surface water potential to release according to HRS Section 4.1.2.1.2																
LR =		500														

LIKELIHOOD OF RELEASE - GROUNDWATER TO SURFACE WATER MIGRATION

		Score	Data Type	Refs
1.	OBSERVED RELEASE: If sampling data or direct observation support a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.			
NOTE:	Evaluate groundwater to surface water migration only for a surface water body that meets all of the following conditions:			
1)	A portion of the surface water is within 1 mile of site sources having a containment factor greater than 0.			
2)	No aquifer discontinuity is established between the source and the above portion of the surface water body.			
3)	The top of the uppermost aquifer is at or above the bottom of the surface water. Elevation of top of uppermost aquifer: Elevation of bottom of surface water body:			
2.	POTENTIAL TO RELEASE: Depth to aquifer: <u>15</u> ft. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 ft or less assign a score of 500; otherwise assign a score of 340. Optionally, evaluate potential to release according to HRS Section 3.1.2.	500	+	2
LR =		500		

**SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET
(Continued)**

DRINKING WATER THREAT TARGETS	Score	Data Type	Refs												
<p>Record the water body type, flow, and number of people served by each drinking water intake within the distance limit in the watershed. If there is no drinking water intake within the target distance limit, assign 0 to factors 3, 4, and 5.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="text-align: center;">Intake Name</th> <th style="text-align: center;">Water Body Type</th> <th style="text-align: center;">Flow</th> <th style="text-align: center;">People Served</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">None.</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Are any intakes part of a blended system? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>If yes, attach a page to show appointment calculations.</p> <p>3. ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates a drinking water intake has been exposed to a hazardous substance from the site, list the intake name and evaluate the factor score for the drinking water population (SI Table 8).</p> <p>Level I: <u>0</u> people $\times 10 =$ <u>0</u></p> <p>Level II: <u>0</u> people $\times 1 =$ <u>0</u> Total =</p>	Intake Name	Water Body Type	Flow	People Served	None.								0	+	35
Intake Name	Water Body Type	Flow	People Served												
None.															
<p>4. POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water intakes for the watershed that have not been exposed to a hazardous substance from the site. Assign the population values from SI Table 9. Sum the values and multiply by 0.1.</p>	0	+	35												
<p>5. NEAREST INTAKE: Assign a score of 50 for any Level I Actual Contamination Drinking Water Targets for the watershed. Assign a score of 45 if there are Level II targets for the watershed, but no Level I targets. If no Actual Contamination Drinking Water Targets exist, assign a score for the intake nearest the PPE from SI Table 9. If no drinking water intakes exist, assign 0.</p>	0	+	35												
<p>6. RESOURCES: Assign a score of 5 if one or more surface water resource applies; assign 0 if none applies.</p> <ul style="list-style-type: none"> • Irrigation (5-acre minimum) of commercial food crops or commercial forage crops • Watering of commercial livestock • Ingredient in commercial food preparation • Major or designated water recreation area, excluding drinking water use. 	5	-													
Sum of Targets T =	5														

Notes: Resources value is assumed.

SI TABLE 9 (FROM HRS TABLE 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY^(a)

Type of Surface Water Body ^(b)	Pop.	Nearest Intake	NUMBER OF PEOPLE								Pop. Value
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	
Minimal Stream (<10 cfs)	0	20	4	17	53	164	522	1,633	5,214	16,325	0
Small to moderate stream (10 to 100 cfs)	0	2	0.4	2	5	16	52	163	521	1,633	0
Moderate to large stream (> 100 to 1,000 cfs)	0	0	0.04	0.2	0.5	2	5	16	52	163	0
Large Stream to river (>1,000 to 10,000 cfs)	0	0	0.004	0.02	0.05	0.2	0.5	2	5	16	0
Large River (> 10,000 to 100,000 cfs)	0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	0
Very Large River (>100,000 cfs)	0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	0
Shallow ocean zone or Great Lake (depth < 20 ft)	0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	0
Moderate ocean zone or Great Lake (Depth 20 to 200 ft)	0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	0
Deep ocean zone or Great Lake (depth > 200 ft)	0	0	0	0	0	0.001	0.003	0.008	0.03	0.08	0
3-mile mixing zone in quiet flowing river (≥ 10 cfs)	0	10	2	9	26	82	261	817	2,607	8,163	0

SI TABLE 9 (FROM HRS TABLE 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY^(a) (Continued)

Type of Surface Water Body	Pop.	NUMBER OF PEOPLE					Pop. Value
		30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	3,000,001 to 10,000,000	
Minimal Stream (<10 cfs)	0	52,137	163,246	521,360	1,632,455	5,213,590	0
Small to moderate stream (10 to 100 cfs)	0	5,214	16,325	52,136	163,245	521,359	0
Moderate to large stream (> 100 to 1,000 cfs)	0	521	1,633	5,214	16,325	52,136	0
Large Stream to river (>1,000 to 10,000 cfs)	0	52	163	521	1,632	5,214	0
Large River (> 10,000 to 100,000 cfs)	0	5	16	52	163	521	0
Very Large River (>100,000 cfs)	0	0.5	2	5	16	52	0
Shallow ocean zone or Great Lake (depth < 20 ft)	0	5	16	52	163	521	0
Moderate ocean zone or Great Lake (Depth 20 to 200 ft)	0	0.5	2	5	16	52	0
Deep ocean zone or Great Lake (depth > 200 ft)	0	0.3	1	3	8	26	0
3-mile mixing zone in quiet flowing river (≥ 10 cfs)	0	26,068	81,623	260,680	816,227	2,606,795	0
Sum =							0

^a Round the number of people to nearest integer. Do not round the assigned dilution-weighted population value to nearest integer.

^b Treat each lake as a separate type of water body and assign it a dilution-weighted population value using the surface water body type with the same dilution weight from HRS Table 4-13 as the lake. If drinking water is withdrawn from coastal tidal water or the ocean, assign a dilution-weighted population value to it using the surface water body type with the same dilution weight from HRS Table 4-13 as the coastal tidal water or the ocean zone.

SI TABLE 10: HUMAN FOOD CHAIN ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Notes: Convert all results and SCDM values to µg/kg or ppb.

If sum of percents calculated for I or J index is ≥ 100%, consider the fishery a Level I target; if sum of I or J index is < 100 percent consider the fishery a Level II target. List only those substances that meet the observed release criteria in a fishery within the target distance limit and have a BCF of ≥ 500; BCF values are found on SI Table 7.

Fishery ID:

Sample Type:		Level I:		Level II:		References:		
Sample ID	Hazardous Substance	Conc. (µg/kg)	Benchmark Conc. (FDAAL)	% of Benchmark	RfD (J index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
None.								
Highest Percent					Sum of Percents		Sum of Percents	

Notes: Samples collected upstream of the nearest downstream fishery do not indicate an observed release [40; 41].

Reference Sample:

SI TABLE 11: SENSITIVE ENVIRONMENT ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Notes: Convert all results and SCDM values to µg/L or ppb.

If the highest % of benchmark calculated is ≥ 100%, consider the sensitive env. a Level I target; if the highest % of benchmark calculated is < 100% consider the sensitive env. a Level II target.

Environment ID:

Sample Type:		Level I:		Level II:		Environment Value:	
Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (AWQC or AALAC)	% of Benchmark	References		
None.							
Highest Percent							

SCDM Version: JUN96

Notes: Samples collected upstream of the nearest downstream sensitive environment do not indicate an observed release [40; 41].

SURFACE WATER PATHWAY (Continued)

HUMAN FOOD CHAIN THREAT WORKSHEET

HUMAN FOOD CHAIN THREAT TARGETS	Score	Data Type	Refs																													
<p>Record the water body type and flow for each fishery within the target distance limit. If there is no fishery within the target distance limit, assign a score of 0 at the bottom of this page.</p>																																
<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Fishery Name: Halls Brook</td> <td style="width: 33%;">Water Body: Minimal Stream</td> <td style="width: 33%;">Flow: 2.7 cfs</td> </tr> <tr> <td>Species: Unknown</td> <td>Production: >0 lbs/yr</td> <td></td> </tr> <tr> <td>Fishery Name: Aberjona River</td> <td>Water Body: Moderate Stream</td> <td>Flow: < 28.9 cfs</td> </tr> <tr> <td>Species: Unknown</td> <td>Production: >0 lbs/yr</td> <td></td> </tr> <tr> <td>Fishery Name: Mystic River (R1)</td> <td>Water Body: Moderate Stream</td> <td>Flow: 28.9 to 100 cfs</td> </tr> <tr> <td>Species: Unknown</td> <td>Production: >0 lbs/yr</td> <td></td> </tr> <tr> <td>Fishery Name: Mystic River (R2)</td> <td>Water Body: Large Stream</td> <td>Flow: > 100 to 118.8 cfs</td> </tr> <tr> <td>Species: Unknown</td> <td>Production: >0 lbs/yr</td> <td></td> </tr> <tr> <td>Fishery Name: Boston Harbor</td> <td>Water Body: Coastal Waters</td> <td>Flow: NA</td> </tr> <tr> <td>Species: Unknown</td> <td>Production: >0 lbs/yr</td> <td></td> </tr> </table>	Fishery Name: Halls Brook	Water Body: Minimal Stream	Flow: 2.7 cfs	Species: Unknown	Production: >0 lbs/yr		Fishery Name: Aberjona River	Water Body: Moderate Stream	Flow: < 28.9 cfs	Species: Unknown	Production: >0 lbs/yr		Fishery Name: Mystic River (R1)	Water Body: Moderate Stream	Flow: 28.9 to 100 cfs	Species: Unknown	Production: >0 lbs/yr		Fishery Name: Mystic River (R2)	Water Body: Large Stream	Flow: > 100 to 118.8 cfs	Species: Unknown	Production: >0 lbs/yr		Fishery Name: Boston Harbor	Water Body: Coastal Waters	Flow: NA	Species: Unknown	Production: >0 lbs/yr		<div style="display: flex; flex-direction: column; align-items: center;"> <div>+</div> <div>-</div> <div>+</div> <div>-</div> <div>+</div> <div>-</div> <div>+</div> <div>-</div> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div>42</div> <div>42</div> <div>42</div> <div>42</div> <div>42</div> <div>42</div> <div>42</div> <div>42</div> </div>
Fishery Name: Halls Brook	Water Body: Minimal Stream	Flow: 2.7 cfs																														
Species: Unknown	Production: >0 lbs/yr																															
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Fishery Name: Boston Harbor	Water Body: Coastal Waters	Flow: NA																														
Species: Unknown	Production: >0 lbs/yr																															
<p>FOOD CHAIN INDIVIDUAL (Select highest value)</p>																																
<p>7. ACTUAL CONTAMINATION FISHERIES:</p> <p>Assign 50 points for a Level I fishery only if tissue samples document an observed release of a substance with a BCF \geq 500 to a fishery within the target distance limit (SI Table 10). List substance(s): _____.</p> <p>Assign 45 points for a Level II fishery if surface water/sediment samples document an observed release of a substance with a BCF \geq 500 to a fishery within the target distance limit (SI Table 10). List substance(s): _____.</p>																																
<p>8. POTENTIAL CONTAMINATION FISHERIES:</p> <p>Assign 20 points for a potential fishery if there is an observed release of a substance with a BCF \geq 500 (SI Table 7) to a watershed containing fisheries within the target distance limit, but no Level I or Level II fisheries are scored because there is no fishery documented between the PPE and the most downstream observed release sample point.</p> <p>If there is no observed release of a substance with a BCF \geq 500 to a watershed, assign a value for potential contamination fisheries from the table below using the lowest flow of all fisheries within the target distance limit.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;">Lowest Flow</th> <th style="width: 65%;">FCI Value</th> </tr> </thead> <tbody> <tr> <td><10 cfs</td> <td style="text-align: center;">20</td> </tr> <tr> <td>10 to 100 cfs</td> <td style="text-align: center;">2</td> </tr> <tr> <td>>100 cfs, coastal tidal waters, oceans, or Great Lakes</td> <td style="text-align: center;">0</td> </tr> <tr> <td>3-mile mixing zone in quiet flowing river</td> <td style="text-align: center;">10</td> </tr> </tbody> </table>				Lowest Flow	FCI Value	<10 cfs	20	10 to 100 cfs	2	>100 cfs, coastal tidal waters, oceans, or Great Lakes	0	3-mile mixing zone in quiet flowing river	10																			
Lowest Flow	FCI Value																															
<10 cfs	20																															
10 to 100 cfs	2																															
>100 cfs, coastal tidal waters, oceans, or Great Lakes	0																															
3-mile mixing zone in quiet flowing river	10																															
FCI Value =		20	+	42																												
Targets T =		20																														

Notes: R1 = Reach 1
R2 = Reach 2

SURFACE WATER PATHWAY (Continued) ENVIRONMENTAL THREAT WORKSHEET

When measuring length of wetlands that are located on both sides of a surface water body, sum both frontage lengths. For a sensitive environment that is more than one type, assign a value for each type.

ENVIRONMENTAL THREAT TARGETS				Score	Data Type	Refs
Record the water body and flow for each surface water sensitive environment within the target distance limit (see SI Table 12). If there is no sensitive environment within the target distance limit, assign a score of 0 at the bottom of the page.						
Environment Type (SI Table 13)	Water Body Name	Flow				
Clean Water Act	Halls Brook	2.7 cfs		+	10	
2.6 Miles Wetlands	Aberjona River	< 28.9 cfs		+	38	
State-threatened species habitat (7)	Aberjona River	< 28.9 cfs		+	36	
0.2 Miles Wetlands	Mystic River (Reach 1)	28.9 to 100 cfs		+	38	
Federal-endangered species habitat (1)	Mystic River (Reach 1)	28.9 to 100 cfs		+	36	
State-endangered species habitat (1)	Mystic River (Reach 2)	> 100 to 118.8 cfs		+	36	
Anadromous Fish Migration Pathway	Boston Inner Harbor	NA		+	44	
Spawning Ground	Boston Inner Harbor	NA		+	44	
9. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: If sampling data or direct observation indicate any sensitive environment has been exposed to a hazardous substance from the site, record this information on SI Table 11, and assign a factor value for the environment (SI Tables 13 and 14). Substance(s): _____ From Table: _____						
Environment Type (SI Table 13)	Environment Value (SI Tables 13 & 14)	Multiplier (10 for Level I, 1 for Level II)	Product			
		×	=			
Sum =				0		
10. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS:						
Flow	Dilution weight (SI Table 12)	Environment Type and Value (SI Tables 13 & 14)	Pot. Cont.	Product		
2.7 cfs	1 ×	Clean Water Act (5) ×	0.1 =	0.5	+	10
10 to 100 cfs	0.1 ×	2.8 mi. wetlands (75) ×	0.1 =	0.75	+	38
		7 State-threat. species (50) ×	0.1 =	3.5	+	36
		1 Fed.-end. species (75) ×	0.1 =	0.75	+	36
100 to 1,000 cfs	0.01 ×	1 State-end. species (50) ×	0.1 =	0.05	+	36
NA	0.0001 ×	Anad. fish mig. path. (75) ×	0.1 =	0.00075	+	44
		Spawning ground (75) ×	0.1 =	0.00075	+	44
Sum =				5.5515		
Sum of Targets T =				5.5515		

**SI TABLE 12 (HRS TABLE 4-13):
SURFACE WATER DILUTION WEIGHTS**

*	TYPE OF SURFACE WATER BODY		Assigned Dilution Weight
	Descriptor	Flow Characteristics	
✓	Minimal stream	< 10 cfs	1
✓	Small to moderate stream	10 to 100 cfs	0.1
✓	Moderate to large stream	> 100 to 1,000 cfs	0.01
	Large stream to river	> 1,000 to 10,000 cfs	0.001
	Large river	> 10,000 to 100,000 cfs	0.0001
	Very large river	> 100,000 cfs	0.00001
✓	Coastal tidal waters	Flow not applicable; depth not applicable	0.0001
	Shallow ocean zone or Great Lake	Flow not applicable; depth less than 20 ft	0.0001
	Moderate depth ocean zone or Great Lake	Flow not applicable; depth 20 to 200 ft	0.00001
	Deep ocean zone or Great Lake	Flow not applicable; depth greater than 200 ft	0.000005
	3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

* Check all (✓) appropriate dilution weights.

Notes:

**SI TABLE 13 (HRS TABLE 4-23):
SURFACE WATER AND AIR SENSITIVE ENVIRONMENTS VALUES**

*	Sensitive Environment	Assigned Value
	Critical habitat for Federal designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument (air pathway only) National Seashore Recreation Area National Lakeshore Recreation Area	100
✓	Habitat known to be used by Federal designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Coastal Barrier (undeveloped) Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area ✓ Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay, or estuary ✓ Migratory pathways and feeding areas critical for the maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time Terrestrial areas utilized by large or dense aggregations of vertebrate animals (semi-aquatic foragers) for breeding National river reach designated as recreational	75
✓	Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
	State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
✓	State designated areas for the protection and maintenance of aquatic life under the Clean Water Act	5
✓	Wetlands See SI Table 14 (Surface Water Pathway) or SI Table 23 (Air Pathway)	

*Check (✓) all environments impacted or potentially impacted by the site.

SI TABLE 14 (HRS TABLE 4-24): SURFACE WATER WETLANDS FRONTAGE VALUES

*	TOTAL LENGTH OF WETLANDS	ASSIGNED VALUE
	Less than 0.1 mile	0
✓	0.1 to 1 mile	25
	Greater than 1 to 2 miles	50
✓	Greater than 2 to 3 miles	75
	Greater than 3 to 4 miles	100
	Greater than 4 to 8 miles	150
	Greater than 8 to 12 miles	250
	Greater than 12 to 16 miles	350
	Greater than 16 to 20 miles	450
	Greater than 20 miles	500

* Check (✓) highest value for each applicable flow characteristic.

Notes:

SURFACE WATER PATHWAY (Concluded)

WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY

WASTE CHARACTERISTICS

Score

<p>11. If an Actual Contamination Target (drinking water, human food chain, or environmental threat) exists for the watershed, assign the calculated hazardous waste quantity score, or a score of 100, whichever is greater. If no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to surface water.</p>	10																																																																											
<p>12. Assign the highest value from SI Table 3 or SI Table 7 for the hazardous substance waste characterization factors below. Multiply each by the surface water hazardous waste quantity score and determine the waste characteristics score for each threat.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 20%;"></th> <th style="width: 20%;">DWT</th> <th style="width: 20%;">HFCT</th> <th style="width: 20%;">ET</th> </tr> <tr> <td>Substance(s):</td> <td>Nickel</td> <td>PCBs</td> <td>PCBs</td> </tr> <tr> <td>Value:</td> <td>10,000</td> <td>5E+08</td> <td>5E+08</td> </tr> <tr> <td>From Table:</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>		DWT	HFCT	ET	Substance(s):	Nickel	PCBs	PCBs	Value:	10,000	5E+08	5E+08	From Table:	3	3	3																																																												
	DWT	HFCT	ET																																																																									
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Value:	10,000	5E+08	5E+08																																																																									
From Table:	3	3	3																																																																									
<p>13. Multiply the toxicity and hazardous waste quantity scores. Assign the waste characteristics score for each threat from the table below.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 20%;">Product</th> <th style="width: 10%;">WC Score</th> <th style="width: 10%;">DWT</th> <th style="width: 10%;">HFCT</th> <th style="width: 10%;">ET</th> </tr> <tr><td>0</td><td>0</td><td></td><td></td><td></td></tr> <tr><td>>0 to <10</td><td>1</td><td></td><td></td><td></td></tr> <tr><td>≥10 to <100</td><td>2</td><td></td><td></td><td></td></tr> <tr><td>≥100 to <1,000</td><td>3</td><td></td><td></td><td></td></tr> <tr><td>≥1,000 to <10,000</td><td>6</td><td></td><td></td><td></td></tr> <tr><td>≥10,000 to <1E+05</td><td>10</td><td></td><td></td><td></td></tr> <tr><td>≥1E+05 to <1E+06</td><td>18</td><td style="text-align: center;">✓</td><td></td><td></td></tr> <tr><td>≥1E+06 to <1E+07</td><td>32</td><td></td><td></td><td></td></tr> <tr><td>≥1E+07 to <1E+08</td><td>56</td><td></td><td></td><td></td></tr> <tr><td>≥1E+08 to <1E+09</td><td>100</td><td></td><td></td><td></td></tr> <tr><td>≥1E+09 to <1E+10</td><td>180</td><td></td><td style="text-align: center;">✓</td><td style="text-align: center;">✓</td></tr> <tr><td>≥1E+10 to <1E+11</td><td>320</td><td></td><td></td><td></td></tr> <tr><td>≥1E+11 to <1E+12</td><td>560</td><td></td><td></td><td></td></tr> <tr><td>≥1E+12 or greater</td><td>1000</td><td></td><td></td><td></td></tr> </table>	Product	WC Score	DWT	HFCT	ET	0	0				>0 to <10	1				≥10 to <100	2				≥100 to <1,000	3				≥1,000 to <10,000	6				≥10,000 to <1E+05	10				≥1E+05 to <1E+06	18	✓			≥1E+06 to <1E+07	32				≥1E+07 to <1E+08	56				≥1E+08 to <1E+09	100				≥1E+09 to <1E+10	180		✓	✓	≥1E+10 to <1E+11	320				≥1E+11 to <1E+12	560				≥1E+12 or greater	1000				
Product	WC Score	DWT	HFCT	ET																																																																								
0	0																																																																											
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	Substance Value	HWQ	Product	WC Score (from Table)	
Drinking Water Threat (DWT) Toxicity × Persistence	10,000 ×	10 =	10,000	18	(Maximum of 100)
Food Chain Threat (HFCT) Toxicity × Persistence × Bioaccumulation	5E+08 ×	10 =	5E+08	180	(Maximum of 1000)
Environmental Threat (ET) Ecotoxicity × Persistence × Ecobioaccumulation	5E+08 ×	10 =	5E+08	180	(Maximum of 1000)

SURFACE WATER PATHWAY THREAT SCORES

Threat (T)	Likelihood of Release (LR) Score	Targets (T) Score	Pathway Waste Characteristics (WC) Score (determined above)	Threat Score $\frac{LR \times T \times WC}{82,500}$	
Drinking Water (DW)	500	5	18	0.545	(Maximum of 100)
Human Food Chain (HFC)	500	20	180	21.82	(Maximum of 100)
Environmental (E)	500	5.5515	180	6.056	(Maximum of 60)

Multiply LR by T and by WC. Divide the product by 82,500 for each threat (T). Sum the threat scores to obtain the surface water pathway score for each watershed/migration route. Select the highest watershed/migration route score. If the pathway score is greater than 100, assign 100.

SURFACE WATER PATHWAY CALCULATION:
(DWT + HFCT + ET) =

28.42

(Maximum of 100)

Notes: $0.545 + 21.82 + 6.056 = 28.42$

Previous scoring scenario: If the former wastewater lagoon is scored as a surface impoundment, the HWQ would increase to 100 and the WC for DW, HFC, and E would equal 32, 320, and 320, respectively. The Surface Water pathway score would then equal 50.52.

SOIL EXPOSURE PATHWAY

Pathway Description and Scoring Notes: Identify all areas of observed contamination. Indicate whether a resident population is associated with the site and characterize the area surrounding the site. Identify the nearby population and any terrestrial sensitive environments located within the target distance limit.

Briefly discuss any sampling events relative to the Soil Exposure Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Soil Exposure Pathway for this site, or any key factors which influenced your scoring rationale.

NERP employs 26 full-time workers on the property [37, p. 2]. There are no residents on the property; the nearest residence is located on Virginia Avenue approximately 2,000 ft southwest of the property [10; 37]. The nearest school to the property is the Altavesta School, located 1.2 miles southwest of the property [9; 26]. No terrestrial sensitive environments were noted on the property [37, p. 2]. An estimated 3,626 persons live within 1-radial mile of the property [6].

Previous investigations conducted on the property by ATEC, Inc. and GZA consisted of collecting subsurface soil samples on the property. All of the soil samples collected were from a depth of greater than 2 ft, therefore, they are considered ineligible for evaluation in the Soil Exposure pathway.

Due to the location of on-site source areas, START did not suspect surficial soil contamination at the property, therefore, START did not perform surface soil sampling as part of the NERP SIP. No other surface soil sampling is known to have been conducted for the NERP property, therefore, no release of hazardous substances to surficial soils from on-site sources has been documented. Furthermore, based on the site observations and conditions, distance to nearest residence (approximately 2,000 ft), and lack of public use of the property, no impacts to nearby residential populations are known or suspected.

SI TABLE 15a: SOIL EXPOSURE OBSERVED CONTAMINATION SUBSTANCES

Source ID:

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	Toxicity	References
None.						
Highest Toxicity						

Notes: No surface soil samples have been collected from on-site sources on the property to date [37].

SI TABLE 15b: SOIL EXPOSURE RESIDENT POPULATION TARGETS

Notes: Convert all results and SCDM values to $\mu\text{g/kg}$ or ppb. If sum of percent calculated for I or J index is $\geq 100\%$, consider residents Level I targets; if sum of I or J index is $< 100\%$, consider the residents Level II targets.

Residence ID:

Level I:

Level II:

Population:

Sample ID	Hazardous Substance	Conc. ($\mu\text{g/kg}$)	RfD (J index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.	References
None.							
Sum of Percents					Sum of Percents		

SCDM Version: JUN96

Notes: No resident population targets are located within the target distance limit of the property [37].

SOIL EXPOSURE PATHWAY WORKSHEET RESIDENT POPULATION THREAT

LIKELIHOOD OF EXPOSURE	Score	Data Type	Refs														
1. OBSERVED CONTAMINATION: If evidence indicates presence of observed contamination (depth of 2 ft or less), assign a score of 550; otherwise, assign a 0. Note that a likelihood of exposure score of 0 results in a soil exposure pathway score of 0.	0	+	37														
LE =	0																
TARGETS																	
2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or day care on contaminated property and within 200 ft of areas of observed contamination (HRS section 5.1.3). Level I: <u>0</u> people \times 10 = <u>0</u> Level II: <u>0</u> people \times 1 = <u>0</u> Sum =	0	+	10														
3. RESIDENT INDIVIDUAL: Assign a score of 50 if any Level I resident population exists. Assign a score of 45 if there are Level II targets but no Level I targets. If no resident population exists (i.e., no Level I or Level II targets), assign 0 (HRS Section 5.1.3).	0	+	37														
4. WORKERS: Assign a score from the table below for the total number of workers at the site and nearby facilities and within areas of observed contamination associated with the site.																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Number of Workers</th> <th style="text-align: center;">Score</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1 to 100</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">101 to 1,000</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;">>1,000</td> <td style="text-align: center;">15</td> </tr> </tbody> </table>	Number of Workers	Score	0	0	1 to 100	5	101 to 1,000	10	>1,000	15	5	+	37				
Number of Workers	Score																
0	0																
1 to 100	5																
101 to 1,000	10																
>1,000	15																
5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Assign a value for each terrestrial sensitive environment (SI Table 16) in an area of observed contamination.																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Terrestrial Sensitive Environment Type</th> <th style="text-align: center;">Value</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr> <td style="text-align: right;">Sum =</td> <td style="text-align: center;">0</td> </tr> </tbody> </table>	Terrestrial Sensitive Environment Type	Value											Sum =	0	0	+	37
Terrestrial Sensitive Environment Type	Value																
Sum =	0																
6. RESOURCES: Assign a score of 5 if any one or more of the following resources is present on area of observed contamination at the site; assign 0 if none applies. • Commercial agriculture • Commercial silviculture • Commercial livestock production or commercial livestock grazing	0	-															
Sum of Targets T=	5																

Notes:

SOIL EXPOSURE PATHWAY WORKSHEET

NEARBY POPULATION THREAT

LIKELIHOOD OF EXPOSURE		Score	Data Type	Ref.
7.	Attractiveness/Accessibility (from SI Table 17 or HRS Table 5-6)	Value: <u>10</u>		
	Area of Contamination (from SI Table 18 or HRS Table 5-7)	Value: <u>5</u>		
	Likelihood of Exposure (from SI Table 19 or HRS Table 5-8)		+	37
LE =		5		

TARGETS		Score	Data Type	Ref.
8.	Assign a score of 0 if Level I or Level II resident individual has been evaluated or if no individuals live within 1/4 mile travel distance of an area of observed contamination. Assign a score of 1 if nearby population is within 1/4 mile travel distance and no Level I or Level II resident population has been evaluated.	1	+	37
9.	Determine the population within 1 mile travel distance that is not exposed to a hazardous substance from the site (i.e., properties that are not determined to be Level I or Level II); record the population for each distance category in SI Table 20 (HRS Table 5-10). Sum the population values and multiply by 0.1.	2.1	+	6
Sum of Targets T =		3.1		

Notes:

**SI TABLE 16 (HRS TABLE 5-5): SOIL EXPOSURE PATHWAY
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES**

*	TERRESTRIAL SENSITIVE ENVIRONMENT	ASSIGNED VALUE
	Terrestrial critical habitat for Federal designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
	Terrestrial habitat known to be used by Federal designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
	Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federal designated endangered or threatened status	50
	State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

* - Check (✓) all environments impacted or potentially impacted by the site.

Notes: No terrestrial sensitive environments are located on the property.

**SI TABLE 17 (HRS TABLE 5-6);
ATTRACTIVENESS/ACCESSIBILITY VALUES**

*	AREA OF OBSERVED CONTAMINATION	ASSIGNED VALUE
	Designated recreational area	100
	Regularly used for public recreation (for example, vacant lots in urban area)	75
	Accessible and unique recreational area (for example, vacant lots in urban area)	75
	Moderately accessible (may have some access improvements-for example, gravel road) with some public recreation use	50
	Slightly accessible (for example, extremely rural area with no road improvement) with some public recreation use	25
✓	Accessible with no public recreation use	10
	Surrounded by maintained fence or combination of maintained fence and natural barriers	5
	Physically inaccessible to public, with no evidence of public recreation use	0

* Check (✓) highest value.

**SI TABLE 18 (HRS TABLE 5-7): AREA OF CONTAMINATION FACTOR
VALUES**

*	TOTAL AREA OF THE AREAS OF OBSERVED CONTAMINATION (SQUARE Ft)	ASSIGNED VALUE
✓	≤ to 5,000	5
	> 5,000 to 125,000	20
	> 125,000 to 250,000	40
	> 250,000 to 375,000	60
	> 375,000 to 500,000	80
	> 500,000	100

* Check (✓) highest value.

Notes: For the purposes of this evaluation, START assumes the area of contamination on the property to be less than 5,000 ft².

**SI TABLE 19 (HRS TABLE 5-8): NEARBY POPULATION LIKELIHOOD OF
EXPOSURE FACTOR VALUES**

Area of Contamination Factor Value	Attractiveness/Accessibility Factor Value						
	100	75	50	25	10	5	0
100	500	500	375	250	125	50	0
80	500	375	250	125	50	25	0
60	375	250	125	50	25	5	0
40	250	125	50	25	5	5	0
20	125	50	25	5	5	5	0
5	50	25	5	5	5	5	0

**SI TABLE 20 (HRS TABLE 5-10): DISTANCE-WEIGHTED POPULATION VALUES
FOR NEARBY POPULATION THREAT**

Travel Distance Category (miles)	Pop.	NUMBER OF PEOPLE WITHIN THE TRAVEL DISTANCE CATEGORY												Pop. Value
		0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,001	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	
Greater than 0 to 1/4	210	0	0.1	0.4	1.0	4	13	41	130	408	1,303	4,081	13,034	4
Greater than 1/4 to 1/2	570	0	0.05	0.2	0.7	2	7	20	65	204	652	2,041	6,517	7
Greater than 1/2 to 1	2,845	0	0.02	0.1	0.3	1	3	10	33	102	326	1,020	3,258	10
Sum =														21

References: 6

Notes:

SOIL EXPOSURE PATHWAY WORKSHEET (Concluded)

WASTE CHARACTERISTICS

Score

10.	Assign the hazardous waste quantity score calculated for soil exposure	10																																	
11.	Assign the highest toxicity value from SI Table 15a. Substance(s): _____ Value: _____ From Table: _____	0																																	
12.	Multiply the toxicity and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below: <table border="1"> <thead> <tr> <th>Product</th> <th>WC Score</th> <th>*</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>✓</td> </tr> <tr> <td>>0 to <10</td> <td>1</td> <td></td> </tr> <tr> <td>≥ 10 to <100</td> <td>2</td> <td></td> </tr> <tr> <td>≥ 100 to <1,000</td> <td>3</td> <td></td> </tr> <tr> <td>≥ 1,000 to <10,000</td> <td>6</td> <td></td> </tr> <tr> <td>≥ 10,000 to <1E+05</td> <td>10</td> <td></td> </tr> <tr> <td>≥ 1E+05 to <1E+06</td> <td>18</td> <td></td> </tr> <tr> <td>≥ 1E+06 to <1E+07</td> <td>32</td> <td></td> </tr> <tr> <td>≥ 1E+07 to <1E+08</td> <td>56</td> <td></td> </tr> <tr> <td>≥ 1E+08 or greater</td> <td>100</td> <td></td> </tr> </tbody> </table> <p>*check (✓) the WC score calculated for the pathway</p>	Product	WC Score	*	0	0	✓	>0 to <10	1		≥ 10 to <100	2		≥ 100 to <1,000	3		≥ 1,000 to <10,000	6		≥ 10,000 to <1E+05	10		≥ 1E+05 to <1E+06	18		≥ 1E+06 to <1E+07	32		≥ 1E+07 to <1E+08	56		≥ 1E+08 or greater	100		0
Product	WC Score	*																																	
0	0	✓																																	
>0 to <10	1																																		
≥ 10 to <100	2																																		
≥ 100 to <1,000	3																																		
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≥ 1E+07 to <1E+08	56																																		
≥ 1E+08 or greater	100																																		
WC =		0																																	

RESIDENT POPULATION THREAT SCORE:

(Likelihood of Exposure, Question 1;
Targets = Sum of Questions 2, 3, 4, 5, 6)

$$(0 \times 5 \times 0) \div 82,500 = 0$$

$$\frac{LE \times T \times WC}{82,500} =$$

0

NEARBY POPULATION THREAT SCORE:

(Likelihood of Exposure, Question 7;
Targets = Sum of Questions 8,9)

$$(5 \times 2.1 \times 0) \div 82,500 = 0$$

$$\frac{LE \times T \times WC}{82,500} =$$

0

SOIL EXPOSURE PATHWAY CALCULATION:

Resident Population Threat (0) + Nearby Population Threat (0) =

0

(Maximum of 100)

Notes: Previous scoring scenario: If the former wastewater lagoon is scored as a surface impoundment, the HWQ would increase to 100, and the Soil Exposure Pathway score would be unchanged at 0.

AIR MIGRATION PATHWAY

Pathway Description and Scoring Notes: Describe the Air Migration Pathway. Identify the nearest potential receptors of airborne contaminants and the population residing within four miles of the site. Identify any sensitive environments located within the target distance limit.

Briefly discuss any sampling events relative to the Air Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Air Pathway for this site, or any key factors which influenced your scoring rationale.

NERP employs 26 full time workers on the property [37, p. 2]. There are no on-site residents on the property; the nearest residence is located on Virginia Avenue approximately 2,000 ft southwest of the property [10; 37]. An estimated 123,376 persons live within 4-radial miles of the property, not including the on-site workers [6]. The following table summarizes the estimated population within 4-radial miles of the property.

Estimated Populations Within 4-Radial Miles of New England Resins & Pigments

Radial Distance from New England Resins & Pigments (miles)	Estimated Population
On a Source	26*
> 0.00 to 0.25	210
> 0.25 to 0.50	570
> 0.50 to 1.00	2,845
> 1.00 to 2.00	21,203
> 2.00 to 3.00	42,713
> 3.00 to 4.00	55,835
TOTAL	123,402

* On-site workers

[6]

An estimated 3,521 acres of wetlands are located within 4-radial miles of the property. In addition, habitats for one State-threatened species, one State-endangered species, and one Federal-candidate species are located within 4-radial miles of the property [36]. The following table summarizes the sensitive environments located within 4-radial miles of the property.

AIR MIGRATION PATHWAY (Concluded)

Sensitive Environments Located Within 4-Radial Miles of New England Resins & Pigments

Radial Distance from New England Resins & Pigments (miles)	Sensitive Environments/Species (status)
> 0.00 to 0.25	14 acres of wetlands
> 0.25 to 0.50	30 acres of wetlands
> 0.50 to 1.00	Water body protected by Clean Water Act
	224 acres of wetlands
> 1.00 to 2.00	519 acres of wetlands
> 2.00 to 3.00	One Federal-candidate species habitat
	1,254 acres of wetlands
> 3.00 to 4.00	One State-threatened species habitat
	One State-endangered species habitat
	1,480 acres of wetlands

[13-16; 36; 38]

During the START on-site reconnaissance and sampling event, ambient air was monitored using a photoionization detector and a radiation meter. No readings above background concentrations were detected [37, p. 5].

No qualitative ambient air samples are known to have been collected from the property. START did not perform air sampling as part of the NERP SIP. Based on the available file information, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred and no impacts to nearby residential populations or sensitive environments are known or suspected.

SI TABLE 21a: AIR PATHWAY OBSERVED RELEASE SUBSTANCES

Note: Mobility equals 1 for all observed release substances.

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	Gaseous or Particulate	Tox. × Mob. = Tox.	References
None.							

Highest Value

Notes: No air samples have been collected from the property to date.

SI TABLE 21b: AIR PATHWAY ACTUAL CONTAMINATION TARGETS

Note: Convert all results and SCDM values to $\mu\text{g}/\text{m}^3$ or ppb.

If sum of percents calculated for I or J index is $\geq 100\%$, consider the targets as Level I; if the sum of I or J index is $< 100\%$ consider the targets as Level II.

Sample ID:

Level I:

Level II:

Distance from Sources (mi):

References:

Hazardous Substance	Conc. ($\mu\text{g}/\text{m}^3$)	Toxicity/Mobility	Benchmark Conc. (NAAQS or NESHAPS)	% of Benchmark	RfD (I index)	% of RfD	Cancer Risk Conc. (J index)	% of Cancer Risk Conc.
None.								
	Highest Tox. × Mobility		Highest Percent		Sum of Percents		Sum of Percents	

Notes: No Air pathway actual contamination targets have been documented to date.

AIR PATHWAY WORKSHEET

LIKELIHOOD OF RELEASE	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation support a release to air, assign a score of 550. Record observed release substances on SI Table 21.			
2. POTENTIAL TO RELEASE: If sampling data do not support a release to the air, assign a score of 500. Optionally, evaluate air migration gaseous and particulate potential to release (HRS Section 6.1.2).	500	+	37
LR =	500		

TARGETS	Score	Data Type	Refs																
3. ACTUAL CONTAMINATION POPULATION: Determine the number of people within the target distance limit subject to exposure from a release of a hazardous substance to the air. Level I: $\frac{0}{10} \text{ people} \times 10 = \frac{0}{10}$ Level II: $\frac{0}{1} \text{ people} \times 1 = \frac{0}{1}$ <div>Total =</div>	0	-																	
4. POTENTIAL TARGET POPULATION: Determine the number of people within the target distance limit not subject to exposure from a release of a hazardous substance to the air using SI Table 22. Sum the values and multiply by 0.1.	38.8	+	6																
5. NEAREST INDIVIDUAL: Assign a score of 50 if there are any Level I targets. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Population exists, assign the Nearest Individual score from SI Table 22.	20	+	6																
6. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (SI Table 13) and wetland acreage values (SI Table 23) for environments subject to exposure from the release of a hazardous substance to the air. <div><table><tr><th>Sensitive Environment Type</th><th>Value</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><th>Wetland Acreage</th><th>Value</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></div>	Sensitive Environment Type	Value							Wetland Acreage	Value									
Sensitive Environment Type	Value																		
Wetland Acreage	Value																		
7. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS: Use SI Table 24 to evaluate sensitive environments not subject to exposure from a release.	1.63425	+	13-16; 36; 37																
8. RESOURCES: Assign a score of 5 if one or more air resources applies within 1/2 mile of a source; assign a 0 if none applies <ul style="list-style-type: none">• Commercial agriculture• Commercial silviculture• Major or designated recreation area	5	-																	
Sum of Targets T =	65.43425																		

Notes: Resources value is assumed.

AIR PATHWAY WORKSHEET (Concluded)

WASTE CHARACTERISTICS

	Score																																	
9. If any Actual Contamination Targets exist for the air pathway, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if there are no Actual Contamination Targets for the air pathway, assign the calculated HWQ score for sources available for air migration.	10																																	
10. Assign the highest air toxicity × mobility value from SI Table 21a or SI Table 3. <div style="display: flex; justify-content: space-around;"> <div>Substance(s):</div> <div>PCBs</div> <div>Mercury</div> <div>Heptachlor</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div>Value:</div> <div>200</div> <div>2,000</div> <div>20</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div>From Table:</div> <div>3</div> <div>3</div> <div>3</div> </div>	2,000																																	
11. Multiply the toxicity and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below: <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th>Product</th> <th>WC Score</th> <th>*</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td></td></tr> <tr><td>>0 to <10</td><td>1</td><td></td></tr> <tr><td>≥10 to <100</td><td>2</td><td></td></tr> <tr><td>≥100 to <1,000</td><td>3</td><td></td></tr> <tr><td>≥1,000 to <10,000</td><td>6</td><td></td></tr> <tr><td>≥10,000 to <1E+05</td><td>10</td><td style="text-align: center;">✓</td></tr> <tr><td>≥1E+05 to <1E+06</td><td>18</td><td></td></tr> <tr><td>≥1E+06 to <1E+07</td><td>32</td><td></td></tr> <tr><td>≥1E+07 to <1E+08</td><td>56</td><td></td></tr> <tr><td>≥1E+08 or greater</td><td>100</td><td></td></tr> </tbody> </table> <p style="margin-top: 10px;">*check (✓) the WC score calculated for the pathway</p>	Product	WC Score	*	0	0		>0 to <10	1		≥10 to <100	2		≥100 to <1,000	3		≥1,000 to <10,000	6		≥10,000 to <1E+05	10	✓	≥1E+05 to <1E+06	18		≥1E+06 to <1E+07	32		≥1E+07 to <1E+08	56		≥1E+08 or greater	100		20,000
Product	WC Score	*																																
0	0																																	
>0 to <10	1																																	
≥10 to <100	2																																	
≥100 to <1,000	3																																	
≥1,000 to <10,000	6																																	
≥10,000 to <1E+05	10	✓																																
≥1E+05 to <1E+06	18																																	
≥1E+06 to <1E+07	32																																	
≥1E+07 to <1E+08	56																																	
≥1E+08 or greater	100																																	
WC =	10																																	

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the air migration pathway score.
If the pathway score is greater than 100, assign 100.

AIR MIGRATION PATHWAY CALCULATION:

$$\frac{LE \times T \times WC}{82,500} =$$

3.97

(Maximum of 100)

Notes: $(500 \times 65.43425 \times 10) \div 82,500 = 3.97$.

Previous scoring scenario: If the former wastewater lagoon is scored as a surface impoundment, the HWQ would increase to 100, the WC would increase to 6 and the Air Migration Pathway score would increase to 7.14.

SI TABLE 22 (FROM HRS TABLE 6-17): VALUES FOR POTENTIAL CONTAMINATION AIR TARGET POPULATIONS

Distance From Site	Pop.	Nearest Individual (choose highest)	NUMBER OF PEOPLE WITHIN THE DISTANCE CATEGORY												Pop. Value	
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000		
On a source	26	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	17	
0 to 1/4 mile	210	*	1	4	13	41	131	408	1,304	4,081	13,034	40,812	130,340	408,114	41	
> 1/4 to 1/2 mile	570	2	0.2	0.9	3	9	28	88	282	882	2,815	8,815	28,153	88,153	28	
> 1/2 to 1 mile	2,845	1	0.06	0.3	0.9	3	8	26	83	261	834	2,612	8,342	26,119	26	
> 1 to 2 miles	21,203	0	0.02	0.09	0.3	0.8	3	8	27	83	266	833	2,659	8,326	83	
> 2 to 3 miles	42,713	0	0.009	0.04	0.1	0.4	1	4	12	38	120	375	1,199	3,755	120	
> 3 to 4 miles	55,835	0	0.005	0.02	0.07	0.2	0.7	2	7	28	73	229	730	2,285	73	
Nearest Individual =		20													Sum =	388

*Score = 20 if the Nearest Individual is within 1/8 mile of a source; score = 7 if the Nearest Individual is between 1/8 and 1/4 mile of a source.

References: 6; 37, p. 2

Notes:

**SI TABLE 23 (HRS TABLE
6-18): AIR PATHWAY
VALUES FOR WETLAND AREA**

*	WETLAND AREA	ASSIGNED VALUE
	< 1 acre	0
	1 to 50 acres	25
	> 50 to 100 acres	75
	> 100 to 150 acres	125
	> 150 to 200 acres	175
	> 200 to 300 acres	250
	> 300 to 400 acres	350
	> 400 to 500 acres	450
✓	> 500 acres	500

* Check (✓) highest value.

Notes:

**SI TABLE 24: DISTANCE WEIGHTS AND
CALCULATIONS FOR AIR PATHWAY POTENTIAL
CONTAMINATION SENSITIVE ENVIRONMENTS**

DISTANCE	DISTANCE WEIGHT	SENSITIVE ENVIRONMENT TYPE AND VALUE (FROM SI TABLES 13 AND 23)	PRODUCT
On a Source	0.10	×	
0 to 1/4 mile	0.025	× 14 acres wetlands (25)	0.625
1/4 to 1/2 mile	0.0054	× 30 acres wetlands (25)	0.135
		×	
		×	
1/2 to 1 mile	0.0016	× Clean Water Act (5)	0.008
		× 224 acres wetlands (250)	0.4
		×	
1 to 2 miles	0.0005	× 519 acres wetlands (500)	0.25
		×	
2 to 3 miles	0.00023	× Federal-candidate species (75)	0.01725
		× 1,254 acres wetlands (500)	0.115
		×	
3 to 4 miles	0.00014	× 2 State-threatened/endangered species (50)	0.014
		× 1,480 acres wetlands (500)	0.07
		×	
> 4 miles	0	×	
Total Environments Score =			1.63425

SITE SCORE CALCULATION	S	S ²
GROUNDWATER PATHWAY SCORE (S _{GW})	26.08	680.1664
SURFACE WATER PATHWAY SCORE (S _{SW})	28.42	807.77
SOIL EXPOSURE PATHWAY SCORE (S _{SE})	0.00	0.00
AIR PATHWAY SCORE (S _A)	3.97	15.76
SITE SCORE $\sqrt{\frac{S_{GW}^2 + S_{SW}^2 + S_{SE}^2 + S_A^2}{4}} =$		19.87

COMMENTS:

Previous scoring scenario: If the former wastewater lagoon is scored as a surface impoundment, the site HWQ would increase to 100, and the overall site score would increase to 33.51.

WARNING!!

EPA has determined that the HRS score of any site that is progressing towards listing on the NPL is confidential. Deliberations regarding scoring or listing issues, the site specific status, and HRS scores cannot be released or discussed with non-Agency persons. For additional guidance see the April 30, 1993 OSWER Directive 9320.1-11.

NEW ENGLAND RESINS & PIGMENTS REFERENCES

- [1] Ecology & Environment, Inc./Field Investigation Team. 1980. Preliminary Site Assessment of New England Resins & Pigments. 6 August.
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- [4] Rose, S. (START). 1997. Phone Conversation Record with Woburn Assessor's Office, RE: Ownership Information for New England Resins & Pigments. TDD No. 97-01-0034. 3 February.
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- [6] Frost Associates. 1997. Project Note, New England Resins & Pigments, RE: Population and Private Well Users. TDD No. 97-01-0034. 5 February.
- [7] U.S. Geological Survey. 1985. Boston North Quadrangle, MA. (7.5 × 15-minute series topographic map).
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- [12] U.S. Geological Survey. 1983. Bedrock Geological Map of Massachusetts. Edited by E-an Zen.
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- [16] U.S. Fish & Wildlife Service. undated. National Wetlands Inventory Map for Boston North Quadrangle, MA.
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**NEW ENGLAND RESINS & PIGMENTS
REFERENCES (Continued)**

- [28] Rose, S. (START). 1997. Phone Conversation Record with Mr. Richard Dubbs, Burlington Water Department, RE: Public Water Supplies, Burlington, MA. TDD No. 97-01-0034. 20 February.
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